INTERNATIONAL PROJECTIONIST

FEBRUARY 1953

VOLUME 28 • NUMBER 2

30c A COPY • $2.50 A YEAR

ALONGSIDE THESE LAMPS STAND THE WORLD'S FINEST PROJECTIONISTS

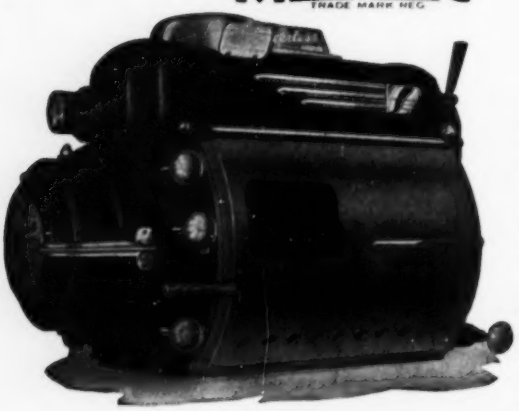
Peerless MAGNARC

TRADE MARK REG.

1-KW TO 70 AMPS

"HY-AX" ARC MAGNET

"HY-LUMEN" REFLECTOR



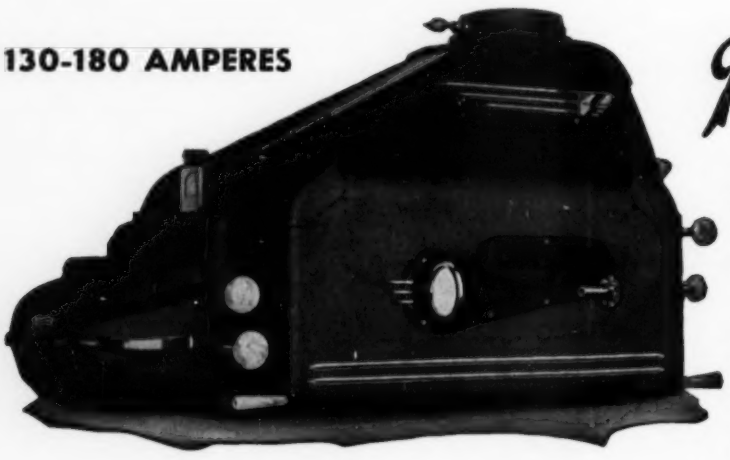
More light at 40 to 70 amperes than ever thought possible. . . . Equals and excels any reflector lamp to 85 amperes, whether they be unapproved water-cooled or resurrected "Hi-Lows". . . . Highest ratio of *honest* screen lumens per arc watt. . . . At 70 amperes, using an accurated Glass Hy-Lumen Reflector*, with a projector having an efficient revolving shutter, it develops the maximum screen brilliance that can be used without a heat filter at no risk of film damage. . . . Operating costs under these conditions are far below that of 85-ampere lamps.

Magnarc Lamps assure 80% side-to-center (SMPE Standard) screen light distribution, not a deceptive 60% or "Hot Center". . . . They are all Und. Lab., Inc. listed. . . . They are *not* insurance hazards. . . . They are and have been for years "The First Choice" of large and small theatres, drive-ins, and the motion picture industry.

* Similar results are not guaranteed if *all-metal reflectors* are used.

"FIRST WITH THE FINEST"

130-180 AMPERES



Peerless HY-CANDESCENT

TRADE MARK REG.

NEW MAGNETIC STABILIZER

This modern lamp produces all the light there is. . . . It is the standard equipment of the nation's largest and finest theatres. . . . Used by 90% of the largest Drive-In Theatres.

It is the "Omega" for maximum screen brilliance. . . . Nothing can even approach it in *white* light volume when used with projectors that have efficient revolving shutters.

Assures satisfying projection for Drive-Ins regardless of the size of the picture, length of throw, and under all weather conditions. . . . They are Und. Lab., Inc. listed and, therefore, *not* insurance hazards. . . . Heat filter assures no risk of film-heat damage at maximum arc amperage and maximum screen lumens.

"WHY EXPERIMENT?"

J.E. McAULEY MFG. CO.

552-554 WEST ADAMS STREET

CHICAGO 6, ILLINOIS

there is ONE RIGHT SPOT for you

ONLY *Strong* SPOTLIGHTS AFFORD ALL THESE ADVANTAGES

- An abundance of exceedingly bright, quiet, flickerless light.
- Sharp edge head spot to flood.
- No heavy rotating equipment required. Simply plug into 110-volt outlet.
- Ready portability. Mounted on casters. Easily disassembled for shipping.
- Two-element, variable focal length objective lens system.
- Silvered glass reflector.
- Horizontal masking control angled 45-degrees in each direction.
- Fast operating 6-slide color boomerang.

TROUPERETTE INCANDESCENT SPOTLIGHT
for small theatres, hotels, night clubs, schools. Projects 6½ times brighter head spots than any other incandescent spotlight. Utilizes all the light through most of the spot sizes as contrasted to spotlights which vary spot size solely by irising, thus losing substantial light.

TROUPER HIGH INTENSITY ARC SPOTLIGHT
for large theatres, arenas, auditoriums, ice shows. Adjustable, self-regulating transformer in base. Automatic arc control. A trim of carbons burns 80 minutes. Slide projector attachment available for projecting clean, sharp, clearly defined pictures even on largest screens.

Please send free literature and prices on the ☐ Strong Trouper Arc Spotlight; ☐ Strong Trouperette Incandescent Spotlight.

NAME _____

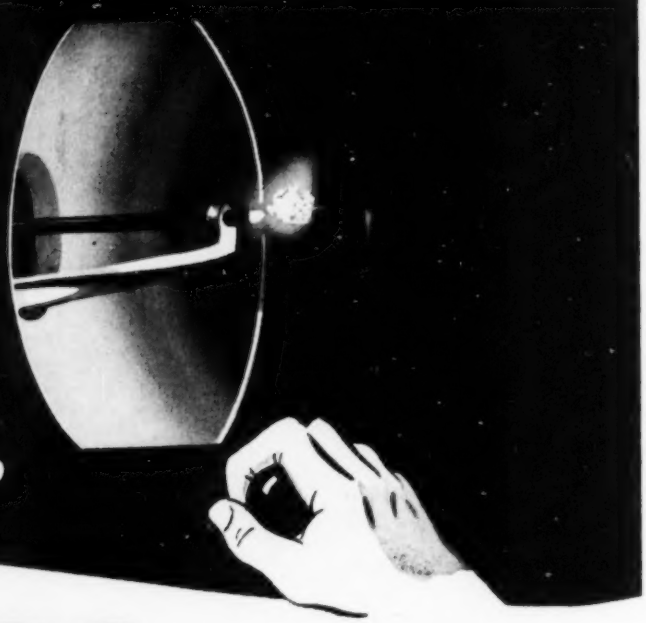
STREET _____

CITY & STATE _____

NAME OF SUPPLIER _____

THE STRONG ELECTRIC CORPORATION
"The World's Largest Manufacturers of Projection Arc Lamps"
14 CITY PARK AVENUE · TOLEDO 2, OHIO

NOW over 5000 more theatres can strike a...



BRIGHTER and WHITER ARC with the NEW

NATIONAL 7mm TRADE-MARK "SUPREX" CARBON

Closely following general acceptance of the sensational, new 9mm "Suprex" carbon, NATIONAL CARBON now offers greatly improved screen light for theatres with variable-feed, mirror-type lamps, using 7mm high-intensity carbons. Specifically, the new "Suprex" carbon provides the following advantages:

- **Brighter and whiter light**
- **More light at *same* current or consumption**
- **Same light at lower current and carbon consumption**

For unequalled uniformity and arc stability, for the *best* in carbons—that research is constantly making *better*—get complete information on this and other recent NATIONAL CARBON developments. Write us—or see your theatre supply dealer who is NOW READY TO SHIP THE NEW 7MM "SUPREX" CARBONS.

ORDER THESE NEW 7mm CARBONS *NOW

- **7mm x 12" Cat. No. L 0521**
- **7mm x 14" Cat. No. L 0525**

*Not recommended for 1 KW fixed feed ratio lamps.

The terms "National" and "Suprex" are trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
IN CANADA: National Carbon Limited – Montreal, Toronto, Winnipeg

INTERNATIONAL PROJECTIONIST

With Which Is Combined PROJECTION ENGINEERING

JAMES J. FINN, *Editor*

Volume 28 FEBRUARY 1953 *Number* 2

Index and Monthly Chat 5

Three-D Projection: Progress Report 7
MERLE CHAMBERLIN

Carbon Arc Gases, Dust: Addendum 12
JAMES J. FINN

Approved Projection Room Ventilation 13
FORMULATED BY THE SMPTE

Introducing: "Modulation" 14
JACK BEHLKE

Letters to the Editor 16

Types of Theatre Sound Reproducers, II 17
ROBERT A. MITCHELL

IP Service Bureau: 101. Ansco Color Film 19

In the Spotlight 20

IA Elections 22

Personal Notes 22

RCA Unveils Transistor Units 23

History of the American Labor Movement, VI 24

Outline of 16-mm Projections 25

Obituaries 26

Strong Announces New 3-D Projection Lighting Equipment 31
ARTHUR HATCH

News Notes
Technical Hints
Miscellaneous Items

Published Monthly by

INTERNATIONAL PROJECTIONIST PUBLISHING CO., INC.

19 West 44 Street, New York 36, N. Y.

Telephone: MUrray Hill 2-2948

R. A. ENTRACHT, Publisher

SUBSCRIPTION REPRESENTATIVES

AUSTRALIA: McGills, 183 Elizabeth St., Melbourne

NEW ZEALAND: Te Aro Book Depot, Ltd., 64 Courtenay Place, Wellington

ENGLAND and ELSEWHERE: Wm. Dawson & Sons, Ltd., Macklin St., London, W. C. 2

YEARLY SUBSCRIPTION: United States and possessions, $2.50 (two years, $4); Canada and foreign countries, $3; single copies, 30 cents. Changes of address should be submitted two weeks in advance of publication date to insure receipt of current issue. Entered as second class matter February 8, 1932, at the Post Office at New York, N. Y., under the act of March 3, 1879.

Entire contents copyrighted 1953 by INTERNATIONAL PROJECTIONIST Publishing Co., Inc. INTERNATIONAL PROJECTIONIST assumes no responsibility for personal opinions appearing in signed articles in its columns, or for unsolicited communications.

MONTHLY CHAT

THE motion picture industry currently may be likened to the man who doesn't know quite where he is going but is in one hell of a hurry to get there. The reason for this indecision is, of course, the feverish activity anent 3-D films *and other processes.*

The use of italics in the last phrase was deliberate, because we think it time that a few misconceptions about the various processes be dispelled. Over the past few years IP has described in detail all of those developments which now are being ballyhooed as "innovations"; and IP reiterates the view expressed in this column on numerous occasions—that all these technical "advances" which now have the industry jumping were easily possible of achievement at any time during the past ten years.

Let's have a quick rundown of the present situation. First, there are true 3-D films and then there are the *other processes.* Affixing the phrase "illusion (or suggestion) of depth" to a process doesn't mean a thing: we've had a "suggestion" of depth in hundreds of pictures over the years.

Neither Cinerama nor the recently announced Cinemascope of 20th-Fox is, to our mind, a 3-D process. Both are merely systems which provide a huge picture and enhanced sound effects. True, with Cinerama one has the impression of being surrounded pictorially and aurally. But it should be noted that the Cinerama show is *all* spectacle; it certainly is not drama. We get the impression that only about 25% of the seats in a Cinerama theatre are top-notch for viewing.

20th-Fox has not yet publicly shown its Cinemascope process, but we gather from the data which they have released that it is simply another big-screen system. Cinemascope has the *economic* advantage of requiring only one camera and one projector, but we have strong doubts that this fact will turn out to be an unmixed blessing, particularly on the exhibition end.

We are firmly convinced that we're not ready yet for a 50- or 60-foot screen. Even if our eyes were able to comfortably encompass such a visual sweep (and IP says "no" to this), we can't see any rhyme or reason for such a size. Joe Doakes talking with Jim Smith, or the perennial boy-and-girl situation, would be nothing short of ludicrous on such a screen. After all, we've had the Magnascope screen for many years, but it was always used for *spectacle*, not drama.

Even if such a large screen were desirable, we just can't get away with it on the projection end for the simple reason that we do not have available the proper light source or the optics. 20th-Fox states that it will use a single projector having a wide-angle lens for projecting Cinemascope pictures. Well, we have yet to see a lens that will do this job and still retain the picture quality we must have; nor are we aware that any American lens manu-

(Continued on page 34)

STRONG IS READY

WITH 3-D PROJECTION LIGHTING

Strong now offers equipment designed especially for the requirements of 3-dimension projection.

TWO PROJECTORS RUN SIMULTANEOUSLY

Most of the many new systems of third-dimension picture projection call for simultaneous operation of two or more projectors and projection arc lamps.

FILTERS—SPECTACLES—LARGER SCREENS

A 50% light loss at the screen resulting from the use of polaroid filters, further light loss to the viewer occasioned by the use of polaroid spectacles, and the increase in screen size which is necessary to overcome the illusion of the projected image being smaller than the actual size of the screen, combine to necessitate an increase in the brilliancy of the existing projection lighting.

LARGER REELS SOLVE CHANGEOVER PROBLEM

Since both projectors run simultaneously, the conventional changeover is impossible unless four or more projectors were used. To make this duplication of equipment unnecessary, reel sizes have been increased to accommodate up to 5000 feet, so that ordinarily only one intermission is necessary.

LAMPS MUST BURN LONGER

This increase in reel size demands lamphouses with a burning time of at least 58 minutes to permit the 50-minute running time without retrimming, the 2-minute burning-in time and a 10% safety factor.

TWO LAMPS—IDENTICAL CHARACTERISTICS

Since each eye sees only one of the two projected images, it is obvious that the intensity and color value of the projected light from both projectors be absolutely identical. Furthermore, the extended burning time required by three-dimensional film makes an automatic means of arc positioning control absolutely essential to obtaining a screen light that is constant in brilliancy and color without the necessity of frequent manual adjustments of the controls.

NEW PROJECTION ARCS REQUIRED

Inasmuch as most arc lamps in present use were designed for projecting only two 20-minute reels without retrimming and usually with a brilliancy not up to 3-D requirements, they obviously cannot be used with this new medium. Since projection arc lamps which deliver this new high in light intensity automatically consume carbons at a faster rate, provision had to be made for a carbon trim which was ample for the extended running time.

Accordingly, there has been created a demand for projection arc lamps which deliver an increased volume of light, for an extended burning time and with light characteristics identical in every instance. All of these requirements have been met in

THE NEW STRONG 90,000-8 (3-D) PROJECTION ARC LAMP

This lamp accommodates a 20-inch trim of carbons which will burn continuously for a full hour at 78 amperes (using 9mm positive and 5/16" negative) or at 95 amperes (using 10mm positive and 11/32" negative).

LIGHTRONIC CRATER POSITIONING

The position of the positive arc crater in the Strong 90,000-8 (3-D) is automatically maintained at the exact focal point of the reflector by means of the exclusive Lightronic crater positioning system. The positive and negative carbons are advanced by separate motors, the speeds of which are governed by the Bi-metal Lightronic Tube. Once the arc has been struck, the crater positioning and the gap length are automatically maintained without manual adjustment. A stream of air directed just above the arc stabilizes its burning.

The optical system comprises an elliptical reflector 16½" in diameter with a resultant speed of f1.9 to match the currently available high speed f1.9 projection lens. The mirror and its tilting mechanism are an integral part of the back door of the lamphouse, which swings out to allow easy cleaning of the reflector and convenient trimming of the lamp.

The Strong 90,000-8 (3-D) features unit construction whereby the various components are instantly removable for cleaning and inspection.

NEW POWER SUPPLIES REQUIRED

In no case will the present power supply equipment, designed to operate only one lamp on 20-minute cycles with 5-minute changeover periods, meet the needs of the condition where two projectcors and two arc lamps are running simultaneously and for extended periods of time. Hence new power supply equipment is needed—equipment which permits long periods of continuous operation. Such equipment has been designed by Strong and is now available for delivery in

THE NEW STRONG 95008 (3-D) 75-85 AMPERE 3-PHASE 220-VOLT TUBE-TYPE RECTIFIERS

with automatic fan air cooling for efficient operation with the new Strong 90,000-8 (3-D) projection arc lamps.

Transformer taps provide adjustment to compensate for supply voltage variations through a range of 10% above or 10% below the rated A.C. input voltage throughout the output rating range.

The complete electrical and mechanical assembly consists of three transformers, six tube sockets, and manually operated output control handle which actuates the 8-point rotary switches that are employed to increase or decrease the output power even when the arc is burning.

The rectifier is built in single lamp units to provide maximum flexibility in electrical connection.

Higher power 3-D rectifiers for use with lamps burning 10mm carbons are also in production and will be available for early delivery.

For further details on the subject of arc lighting as it applies to the projection of three-dimensional pictures by any system, address your request to

Department 3-D

THE STRONG ELECTRIC CORPORATION

CITY PARK AVENUE TOLEDO 2, OHIO

INTERNATIONAL PROJECTIONIST

VOLUME XXVIII FEBRUARY 1953 NUMBER 2

Three-D Projection: Progress Report

By MERLE CHAMBERLIN

Director of Projection, M-G-M Studios, Culver City, California

The second in a series of articles on three-dimensional motion pictures which assays the progress made to date in projection equipment and procedure which will lend maximum effectiveness to the presentation of this new visual medium.

IN IP last month* the writer ventured the opinion that projectionists were in for a New Deal in projection. This opinion was predicated on the assumption that box-office jingle resulting from the cash customers attracted by "Bwana Devil" would start the industry thinking—and acting.

Well, as if "Bwana Devil" weren't enough, along came Sol Lesser with five shorts which he is exhibiting around the U. S. A. under the heading of the "Tri-Optican" or "Stereo-Techniques". This is the English Spottiswoode process which basically follows the procedure of our previously described Natural Vision (N-V) process which was used for "Bwana Devil." projector filters and Polaroid viewing glasses are the same. The only deviation in procedure of these two systems is the fact that in photographing his short subjects, Spottiswoode utilizes "convergence" for special effects. This term, as it affects the projectionists, will be more fully explained subsequently.

The Tri-Optican exhibitions followed the same pattern as their predecessor. The cash customers are flocking to the box-office, they are not objecting to wearing glasses, they are not objecting to the intermissions, and, for the same reason explained in the "Bwana Devil" article (automatic concession break), the exhibitors are not objecting to the intermissions or anything else.

Dizzy Pace Being Set

We should expect that the natural result of all this would be an upbeat in activity along 3rd-dimension lines in Hollywood. Our expectations are being realized to the full. Hollywood is a veritable beehive of stereoscopic activity. The writer is going to attempt to keep you up to date, stereoscopically speaking, in this and subsequent articles. The only deterrent in this attempt will be the speed with which progress is being made. Our monthly reports in IP will try to keep our readers abreast of current developments. One month is a long period of time when measured by the rapidity of technical changes in Hollywood at present.

At least two of the major producers have signed to do a show using the N-V process. One of the pictures, Warner Bros.' "Wax Works" is in actual shooting status. *All* of the other majors and most of the independents are experimenting feverishly with various modifications of the Polaroid (analyzer) system. This means that all processes so far are to be dependent on the simultaneous projection of two films. Tests are rolling on every lot with a myriad of variations of the photographic process. In other words, we are in it—3-D is here—and if it is to provide that needed shot-in-the-arm to the box-office, let us as projectionists exert our *very best* efforts.

Projectionist a Prime Cog

In view of the foregoing, we should examine the situation as it specifically pertains to us projectionists. The importance of the projectionist in this impending technical revolution cannot be over-emphasized. That others share this opinion is borne out by the fact that on January 22 of this year the writer attended a three-hour technical meeting of the Motion Picture Research Council which was devoted exclusively to "Stereo Motion Picture Projection Problems."

Subsequently we will discuss these problems in terms of comments, explanations, and solutions. Some of these comments may seem at variance with previously published data. These apparent contradictions can be charged to the speed with which the process is

*"Natural Vision—Another Step in the Right Direction," January, 1953, p. 5.

developing as well as to the fact that the writer is basing his theories on many years as a theatre projectionist, chief projectionist of a circuit, studio projectionist, studio process (rear projection) projectionist and, for the past 15 years, supervisor of projection for M-G-M studios.

Let's analyze the projection of dual-film N-V through its various steps from the screen to every item in the projection room that affects our presentation of a Polaroid (analyzer) picture:

Projection Screen Data

A. THE SCREEN: A matte-surface normal projection screen will depolarize our picture; in other words, the "depth" effect for which we are striving will be lost. This leaves us with the fact that we must have a metallized surface on our screen. Aluminizing is preferred because of the very low deviation (approx. 10%) in the normal color spectrum reproduction that is realized from this surface.

We all are familiar with the fact that a screen with a metallized surface will be semi-directional, thereby resulting in added reflectivity. This will give us a slight gain in illumination at the screen. The writer has confined his tests to the Walker HI-intensity screen. These tests have indicated (for light loss-gain computations) a 1.70 gain in picture brightness.

B. VIEWERS: Each person viewing the picture must wear Polaroid spectacles. The first ones that made their appearance were plastic lenses in paper frames. These are given to the patron and then forgotten. In most cities it would be a violation of health laws to reissue these spectacles.

New Improved Viewers

As the screening multiplied, a better viewer made its appearance. We have seen both glass and plastic lenses mounted in plastic frames. These are much better looking spectacles and, theoretically, may be sterilized. After use they are run through a sterilizer which is much the same as a barber uses to electrically sterilize a razor. Whether or not this procedure will prove practical remains to be seen.

These viewers provide correct polarization for the right and the left eye. The right eye sees only that image which is projected leftward by the right-hand projector, and the left eye is similarly restricted to the left-hand picture. Light transmission of these viewers has been determined to be in the neighborhood of 0.8.

Filter Placement Vital

C. PROJECTOR FILTERS: A Polaroid filter must be provided for each projector. These filters perform the same function for the projectors as the viewing spectacles do for the audience—they separate the two pictures, one filter for the right projector and its opposite for the left projector.

Filters now in use are made of gelatin and are hung in front of the projector portholes. They must be level and must be placed in only one position perpendicular to the projector lens. This has presented a problem inasmuch as too many factors (mounting, air currents, *etc.*) can affect the permanence of the placement of these filters.

Glass Filter Experiments

Experiments are now being conducted to determine the practicability of mounting glass filters on the front of the projector lens. Stops will be provided and placement will be governed by guides on the lens mounts. Guides cannot be placed on the lens barrels due to the fact that there is too much danger of a lens being turned when replaced after removal for cleaning. Polarizing filters must not be rotated. Light transmission of present projector filters has been approximated at 0.5.

Screen Brightness Problem

D. PICTURE BRIGHTNESS: This item has been placed in sequence here because to determine where we stand on illumination intensity, we use the data obtained from items *A, B* and *C*. Assuming that we started out with a matte surface screen in *good* condition, we had what could be termed 100% picture brightness. To determine what we have left we take our screen gain (1.70) X our viewer transmission (0.8) X our projector filter transmission (0.5) and discover that, mathematically, we end up with only 58% of our original screen brightness as a result of using the necessary elements of a Polaroid projection system.

Mathematically this is the case. Visually we have our doubts. We are still looking at one picture (one eye at a time) but the effect is as though we were *not* experiencing the excessive brightness loss that is indicated by our computations. We do, however, experience a feeling of dullness — the "snap" is gone. This means that we must utilize every possible means to increase our screen brightness. So, right here let us find out what can be done to increase that screen illumination.

Every item in the light path is important. Our screen has been taken care of. The next light loss potential (working in reverse) is the portholes. Is the glass itself any good? Or is it glass suitable only for ordinary windows? Maybe it is a replacement from the local hardware store when the original glass was broken.

In any event, our *via* ports light loss can be anywhere from 7% to 15% depending entirely on the quality of the glass. In testing port glass the writer has realized fine results when specifying "optical plate selected for parallelism."

Light Transmission Units

The next item to check is our shutter(s). Maybe we have one in front, one at the cooling plate, or both. All we *have* to cover with that master blade is the pull-down of the picture, so in most cases we can open up a bit for a nice light gain. Naturally, if we go too far we're going to have travel-ghost trouble which won't help a bit. It takes a solid 85° of the 360° shutter to completely cover our film pull-down, so let's try

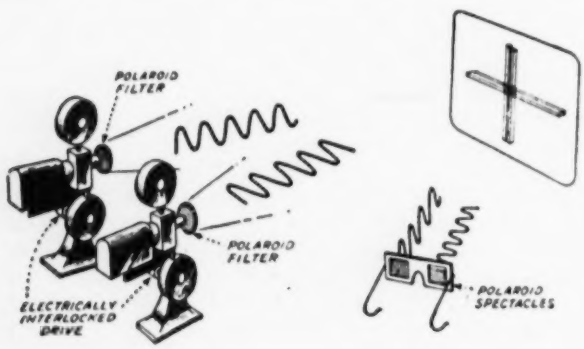


Diagram of a typical double projector installation using Polaroid filters on the projectors, plus viewing spectacles and projector interlock.

"Light housekeeping . . . a necessity"

Obvious to everyone may be the fact that not enough light is getting to the screen; or that the sound system is not functioning properly.
The reasons, however, may be varied—equipment failure, inadequate housekeeping, or a drop in power output.
Aid in this type of trouble-shooting may be obtained from the Eastman Technical Service for Motion Picture Film which Kodak maintains at strategic centers to cooperate with producers, processors, and exchanges and exhibitors.

Address:
Motion Picture Film Department
EASTMAN KODAK COMPANY, Rochester 4, N. Y.

East Coast Division
342 Madison Avenue
New York 17, N. Y.

Midwest Division
137 North Wabash Avenue
Chicago 2, Illinois

West Coast Division
6706 Santa Monica Blvd.
Hollywood 38, California

and keep those master blades at 85°+.

We now take a look at our lens. Are they the new half-size (2 11/32") coated jobs? If so, we can't accomplish much in that direction. If they are half-size but uncoated, let's hop up the light by getting a pair of loaners and get ours polished and coated. If our lens turns out to be the quarter-size gems that were thrown in with the linoleum when the theatre was built, let's really hit the light jackpot by buying some new ones.

Now for the light source itself. Are we operating our present lamps at a respectable level in respect to the picture size? Are we practicing false economy by using smaller trims than we should to show a $50 per year book-saving on carbons? Are the results realized from our antiquated lamps behind the photographic and print quality of today's motion picture? Are our condensers or mirrors pitted beyond all hope of performing the function for which they were intended? If any or all of these four questions can be answered in the affirmative, the remedy is elementary.

Arclamps, Power Source

After all these matters are corrected, we must still look to our lamps and power for an increase in illumination. If our power source (be it generator or rectifiers) possesses sufficient capacity, we should be able to install a larger trim and increase our amperage. We can always realize a gain by reducing our resistance by cooling our carbons.

To date, water has been the most efficient agent for cooling carbons. M-G-M, has used water cooling on higher amperage projection arcs since 1932. A consistently brighter and cleaner picture (particularly for background projection) has been the result. Arc Kits that embody the water-cooling principle can be obtained for any Super-X or Hi-Intensity type projection lamp.** If we are really flush, one manufacturer is marketing a new lamp with the entire water system an integral part of his equipment.

When contemplating any increase in load on our power facilities, we must bear in mind that fact that when projecting the 2-film (N-V) show *both* lamps will be burning at the same time. Our lamp supply facilities must be able to carry that load for extended periods up to one hour. In cases where present facilities will not handle that load, we must obtain another generator or, as the case may be, a rectifier to handle the increase in load.

Now, then, with all requisites as outlined previously herein having been observed (precise optical alignment being a *must* and all corrections and modifications having been made) our light source should be adequate.

Interlock for Perfect Sync

E. INTERLOCK: Until such time as someone announces a two-headed projector (double movement, lens, *etc.*) we are going to have to depend on the interlocking of two projectors for the projection of 2-film, 3rd dimension. This is so that the two pictures can be projected in perfect synchronization frame for frame. Separate copies of the same picture are viewed by the right and left eye, but those corresponding copies must be seen at the same instance. A rather weird effect is accomplished by putting those pictures as little as *one frame* out of sync. This means that we must provide a *positive* interlock for our projectors.

The situation in this respect reminds us of the growing pains that came with the advent of sound. Remember? A new sound system was announced every month.

The first commercial theatre presentation of 2-film, 3rd dimension was on November 26, 1952. It is now three months later and the writer knows of *nine* interlock systems already on the market. We have our choice. All we can do is hope we select the right system.

The prime requisite is a *positive* interlock. Our machines must start together, finish together and never float apart as much as one sprocket hole during the entire screening. Ease of positive alignment, simplicity of installation, flexibility of programming, and safety for the projectionist all can be sacrificed in the interest of original purchase price if reliability of interlock is positively determined.

Types of Interlocks

Types of interlock systems available at the moment range from a flexible shaft job for less than $200 to a heavy-duty, 3-phase electrical installation for about $900. If *any* interlock is purchased, be sure that all exposed moving gears, chains, shafts, *etc.*, are properly equipped with guards. If not provided, have them made or make adequate guards yourself.

Serious and permanent injury can result in getting tangled up in any interlock equipment. Experience has proven that a 3-phase electrical interlock is the most reliable and dependable type. The writer is referring to the "driver-slave" system that is simple to install, positive in alignment, and does not require a major equipment relocation in the projection room. This type differs from some of the electrical systems on the market in that alignment is positive and foolproof. In any event, insist on a positive and *permanent* interlock when purchasing either a mechanical or electrical kit.

In conjunction with the interlock, it might be well to mention here that, as well as keeping our pictures in sync, we must also keep them aligned horizontally and vertically. The two projectors must be superimposed before each show. This is done with the chart provided. Horizontal and vertical lines must appear as one of each when both mechanisms are projecting the chart. Once set, the vertical lines have to ride along pretty much as is throughout the show. The horizontal lines can be checked and trimmed with the framing

(Continued on page 27)

**"Huff's Hydro-mag water coolers.

'Abundant Practical Data'

"We enjoyed so much the article, 'Natural Vision—Another Step in the Right Direction,' by Merle Chamberlain in the January issue of your magazine.

"The broad explanation of third dimension as covered by this article—and the technical details of Natural Vision immediately following—is perhaps the most useful and timely bit of information concerning third dimension we have ever seen. There is no doubt but that the industry is once again in a most important period of transition, and this article contains an abundance of worthwhile practical information needed by everyone.

"Every projectionist not already a subscriber to IP should immediately become one so that he may know more of the technical aspects of third dimension projection, and in the many other helpful technical articles concerning his profession which you publish consistently.

"Please accept our thanks for your permission to reprint the article, and for making available to us and the industry this much needed and important technical information."

ALLEN C. SMITH
National Theatre Supply Co., New York.

RADIANT ENERGY

One thing your theatre can't do without

Theatregoers have been educated to expect super-brilliant projection. Therefore, screen light in abundance is as essential as the very films you buy. Regardless of how big your screen may be, install

NATIONAL EXCELITE

75-130 Ampere High Intensity Reflector Type

PROJECTION ARC LAMPS

and you'll have the brightest pictures and at the lowest cost.

DISTRIBUTED BY

NATIONAL THEATRE SUPPLY

Division of National • Simplex • Bladworth, Inc.

"THERE'S A BRANCH NEAR YOU"

Carbon Arc Gases, Dust: Addendum

By JAMES J. FINN

EVERY few years there appears in the literature an item which sets off a flurry of comment on a topic that has long engaged the attention of serious thinkers in the medical, industrial and Labor Union fields — the concentration within a given area of dusts or gases, or both, from the combustion of the carbon arc and their effect upon motion picture projectionists who daily operate such arcs.

Such an item appeared in the "Spotlight" department of IP for December last (p. 20), reading as follows:

> "If your Local has any record of a member having contracted silicosis or berylcosis as a result of breathing carbon dust or gases, Frank W. Costello, secretary-treasurer of Local 162, San Francisco, would appreciate full details. Local 162 is attempting to collect compensation for a member who has been hospitalized; but under California laws it is necessary to prove direct connection between the disease and occupational conditions."

Neither Secretary Costello nor anybody else interested in this topic need harbor the feeling that they are running up a blind alley, because the literature is replete with precise data bearing on the various aspects of this subject, with IP itself having contributed substantially to the sum total. A rather extensive bibliography appended hereto will serve as an accurate guide to reliable information for those who wish to pursue the matter to any great extent.

Summary of Data

A quick rundown in the form of a summary of the reliable data available to date on this topic might be helpful.

DUSTS: The chemical composition of the ash produced from the burning carbon electrodes shows that only 1.79% of the Flue Condensate is silicon dioxide, while the Lamphouse Condensate presents 1.21%. The remainder of the ash is made up principally of rare earth oxides. No beryllium enters into the composition of the projector carbons.

Drinker and Snell[4] have shown that in the projectionist's position they found the following dust counts: 0.57, 2.90, and 16.70-millions dust particles per cubic foot. When it is considered that less than 2% of the total ash is silicon dioxide, it is readily apparent that the possible exposure to this dust is minimal and not an amount thought to be capable of producing a silicosis, for example.

The accepted limit for total dust (below 5% free silicon dioxide) is 50 million particles per cubic foot of air breathed for an 8-hour day, five days a week, and none of these determinations of Drinker and Snell approaches this amount. This accepted limit is that adopted and termed the "threshold limit" at the meeting of the American Conference of Governmental Industrial Hygienists in Cincinnati in April, 1952.

Gas Concentration Level

GASES: The following is summarized from "Gases from Carbon Arcs and Their Effects," by A. C. Downes.[12] There is produced in the process of burning of the arclamp, carbon dioxide and carbon monoxide, which are far below the range considered to be toxic even in the undiluted stack gases. Nitrogen dioxide [illegible] found in toxic quantities in the undi[luted] stack gases, but in the air of the [pro]jection room the concentration do[es] nearly approach what is usually [con]sidered the now generally acc[epted] threshold limit value of 25 parts [per] million.

In a report of a study of 147 the[atres] by the Department of Health of the [City] of Detroit, Michigan, by W. G. [Fred]erick, the highest average concentr[ation] of oxide of nitrogen reported wa[s] parts per million. Further studies o[f] flue gases have failed to present [evi]dence of the presence of hydroc[yanic] acid, cyanogen, hydrogen sulphide, [ben]lene, phosphine, arsine, stibine, chl[orine] and other halogens. No ozone was f[ound].

Positive Ventilation Vital

On the basis of the foregoing, it [would] seem that the evidence is pretty [clear] that there is little danger to the [pro]jectionist even with low rates of [air] house and projection room ventil[ation]. In fact, it would appear that if the[re is] sufficient ventilation provided for [com]fortable working conditions, there [will] not be any appreciable concentrati[on] arc gases or dust in the projection room.

This brings us down to the one remaining important factor in the situation—*adequate room ventilation*. Now, what does "adequate" room ventilation mean to the writer, to Secretary Costello and thousands of other projectionists who operate carbon arcs daily—*and* to the hundreds of penny-pinching exhibitors who have ducked this question for years in such fashion as to make it an industry disgrace?

Well, there is a standard of projection room ventilation which was promulgated by no less an authority than the Society of Motion Picture & Television Engineers, and it was this standard that provided a powerful impetus to the drive by various alert Local Union leaders for vastly improved room ventilation.

[4] HENDERSON, Y., AND HAGGARD, H. W.: "Noxious

Attention! Roy Brewer and I. A. West Coast Studio Technicians

Decree-law No. 565 endows an Executive Commission for the Film Industry with powers to stimulate Cuban film production. This decree-law authorized the Commission to advance producers up to 33% of the production costs of a film, against subsequent replayment from receipts. In addition to helping finance production costs, this provision of the law in effect underwrites 33% of the producer's losses, should he experience losses.

The law also empowers the Commission to acquire studios and production equipment, to lease these facilities to private producers at low cost, to hire studio personnel as necessary, and to promote the film industry's development in other respects with the funds at the Commission's disposal. It is understood that the Commission's operations will be financed by special drawings of the National Lottery, a source of funds already used to finance construction of the Government-owned "Film City," completed this year in the suburbs of Havana.

The Film City studios have not been put to use so far, because of lack of production equipment there, and also the hesitancy of local entrepreneurs to undertake feature-length film production in the face of the indifferent box-office returns of films previously made in Cuba.

Gases," *A. C. S. Monograph* (1927).

[4] Drinker, P., and Shell, J. R.: "Ventilation of Motion Picture Booths," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 321.

[5] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W. and Bayliss, M.: "Combustion Products of the Carbon Arc," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 312.

[6] MacQuiddy, E. L. Tollman, J. P., LaTowsky, L. W., and Bayliss, M.: "Biological Effects of Inhalation of Carbon Arc Fumes," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 297.

[7] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W., and Schonberger, S.: "Tissue Reaction of Some Carbon Arc Dusts," *Jour. Ind. Hyg. and Tox.*, XXI (Dec. 1939), p. 498.

[8] Tollman, J. P., MacQuiddy, E. L., and LaTowsky, L. W.: "Acute Poisoning in Animals after Intraperitoneal and Intratracheal Administration of Dusts," *Jour. Ind. Hyg. and Tox.*, XXI (Dec., 1939), p. 514.

[9] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W., and Schonberger, S.: "Biological Effects of Filtered Arc Gases and Pure Nitrogen Oxides," (*from unpublished ms.*).

[10] Van Wijk, A. M., and Patterson, H. S.: "The Percentage of Particles of Different Sizes Removed from Dust Laden Air by Breathing," *Jour. Ind. Hyg. and Tox.*, XXII (Jan., 1940), p. 31.

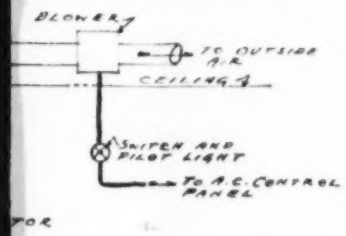
[11] Frederick, W. G.: "A Study of the Motion Picture Industry in Detroit," read before the American Conference on Occupational Disease and Industrial Hygiene, Cleveland, Ohio (1939).

[12] Downes, *A. C.*: "Gases from Carbon Arcs and Their Effects," *J. Soc. Mot. Pict. & Tv. Eng.*, XXXV (July, 1940), p. 32.

Does Your Projection Room Conform?

Approved Projection Room Ventilation

AS FORMULATED BY THE PROJECTION PRACTICE COMMITTEE OF THE SMPTE



...u.-ft. per min.; minimum air movement ...le, 15 cu.-ft. per min.

... Fig. 1 shows the general arrange... . The ducts shall be of non-com...ble material, not less than 1 inch ...

...e fresh-air supply to the projection ... shall consist of not less than two ...e ducts located at or near the floor ...at opposite ends of the room, and ... be connected into the main air-...ly ducts of the building. *There shall ...o connection between this air-supply ...m and any of the exhaust systems ...e projection room.*

... is recommended that gravity-op... dampers connected to the emer... gency porthole release system be installed in the fresh-air intake registers to prevent smoke from entering the main theatre fresh-air duct system, in case of a fire in the projection room area.

...pumped by means of a local damper between the projector lamphouse and the projection room ceiling, and in addition, by means of the damper on the lamphouse proper, if such a control be provided.

This exhaust system shall be operated by an exhaust fan or blower having a capacity of not less than 50 cubic-feet of air per minute for each arc lamp connected thereto. The exhaust fan or blower shall be electrically connected to the projection room wiring system and shall be controlled by a separate switch, with pilot lamp, within the projection room proper.

Minimum Air Circulation

There shall be at no time less than 15 cubic-feet of air per minute through each lamphouse into this exhaust system.

The projection room exhaust system shall be a positive mechanical exhaust system having a normal capacity of not less than 200 cubic-feet per minute and having an auxiliary emergency capacity of not less than 1000 cubic-feet per minute for operation in emergency, *i.e.*, fire. The ventilation system shall terminate in ceiling grilles in the projection room, which shall not be less than two in number. *In no case shall this room exhaust system be connected into any of the ventilating systems of the theatre proper.*

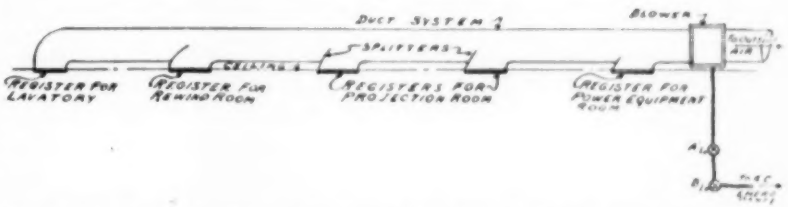
The emergency position of this fan shall be controlled by a switch (Fig. 2) operated automatically by the shutter control system, when the latter is actuated either manually or by melting of the fusible links. This exhaust fan shall be electrically connected to the emergency lighting system of the building. Control shall be provided for manual operation of this fan from a point immediately outside the projection room proper, in addition to the emergency control in the shutter system.

[Note: Elsewhere in the same report The Committee states emphatically that "there shall be no connection between the projection arc exhaust system and any part of the rewind ventilating system."]

Major Opposition to Theatre Tv

Most of the opposition to the plan of the motion picture industry to obtain substantial spectrum space for film theatre Tv is coming from two major groups in the mobile microwave fields. The American Petroleum Institute's Central Committee on Radio Facilities and the National Committee for Utilities Radio have disclosed that they are presenting to the FCC in the theater Tv hearings extensive testimony and significant exhibits to substantiate their positions that microwave systems are vital to their operations and are most important to the national mobilization implementation and the nation's economy.

With the leading electronic-radio manufacturers such as G. E., RCA, Philco, Federal Telephone & Radio, Raytheon and Motorola engaging in extensive development and production programs in microwave, the views of these major industries—as well as that of the military services—undoubtedly are to receive the most serious consideration by the FCC.



General and emergency ventilation system: normal blower capacity 200 cu.-ft. per min.; emergency capacity 2000 cut.-ft. per min.

(A) Switch and pilot lamp for normal operation, inside projection room; (B) switch and pilot lamp for emergency operation, outside door of projection room; also connected to port fire-shutter control mechanism.

(Two or more fresh-air intakes required at or near the floor at opposite ends of the room).

Carbon Arc Gases, Dust: Addendum

By JAMES J. FINN

EVERY few years there appears in the literature an item which sets off a flurry of comment on a topic that has long engaged the attention of serious thinkers in the medical, industrial and Labor Union fields — the concentration within a given area of dusts or gases, or both, from the combustion of the carbon arc and their effect upon motion picture projectionists who daily operate such arcs.

Such an item appeared in the "Spotlight" department of IP for December last (p. 20), reading as follows:

> "If your Local has any record of a member having contracted silicosis or berylcosis as a result of breathing carbon dust or gases, Frank W. Costello, secretary-treasurer of Local 162, San Francisco, would appreciate full details. Local 162 is attempting to collect compensation for a member who has been hospitalized; but under California laws it is necessary to prove direct connection between the disease and occupational conditions."

Neither Secretary Costello nor anybody else interested in this topic need harbor the feeling that they are running up a blind alley, because the literature is replete with precise data bearing on the various aspects of this subject, with IP itself having contributed substantially to the sum total. A rather extensive bibliography appended hereto will serve as an accurate guide to reliable information for those who wish to pursue the matter to any great extent.

Summary of Data

A quick rundown in the form of a summary of the reliable data available to date on this topic might be helpful.

DUSTS: The chemical composition of the ash produced from the burning carbon electrodes shows that only 1.79% of the Flue Condensate is silicon dioxide, while the Lamphouse Condensate presents 1.21%. The remainder of the ash is made up principally of rare earth oxides. No beryllium enters into the composition of the projector carbons.

Drinker and Snell[4] have shown that in the projectionist's position they found the following dust counts: 0.57, 2.90, and 16.70-millions dust particles per cubic foot. When it is considered that less than 2% of the total ash is silicon dioxide, it is readily apparent that the possible exposure to this dust is minimal and not an amount thought to be capable of producing a silicosis, for example.

The accepted limit for total dust (below 5% free silicon dioxide) is 50 million particles per cubic foot of air breathed for an 8-hour day, five days a week, and none of these determinations of Drinker and Snell approaches this amount. This accepted limit is that adopted and termed the "threshold limit" at the meeting of the American Conference of Governmental Industrial Hygienists in Cincinnati in April, 1952.

Gas Concentration Level

GASES: The following is summarized from "Gases from Carbon Arcs and Their Effects," by A. C. Downes.[12] There is produced in the process of burning of the arclamp, carbon dioxide and carbon monoxide, which are far below the range considered to be toxic even in the undiluted stack gases. Nitrogen dioxide was found in toxic quantities in the undiluted stack gases, but in the air of the projection room the concentration does not nearly approach what is usually considered the now generally accepted threshold limit value of 25 parts per million.

In a report of a study of 147 theatres by the Department of Health of the City of Detroit, Michigan, by W. G. Frederick, the highest average concentration of oxide of nitrogen reported was 5.2 parts per million. Further studies of the flue gases have failed to present evidence of the presence of hydrocyanic acid, cyanogen, hydrogen sulphide, acetylene, phosphine, arsine, stibine, chlorine, and other halogens. No ozone was found.

Positive Ventilation Vital

On the basis of the foregoing, it would seem that the evidence is pretty clear that there is little danger to the projectionist even with low rates of lamphouse and projection room ventilation. In fact, it would appear that if there be sufficient ventilation provided for comfortable working conditions, there cannot be any appreciable concentration of arc gases or dust in the projection room.

This brings us down to the one remaining important factor in the situation—*adequate room ventilation.* Now, what does "adequate" room ventilation mean to the writer, to Secretary Costello and thousands of other projectionists who operate carbon arcs daily—*and* to the hundreds of penny-pinching exhibitors who have ducked this question for years in such fashion as to make it an industry disgrace?

Well, there is a standard of projection room ventilation which was promulgated by no less an authority than the Society of Motion Picture & Television Engineers, and it was this standard that provided a powerful impetus to the drive by various alert Local Union leaders for vastly improved room ventilation.

Specitic Data Required

Mr. Costello's problem, no less than that of any other interested parties, would seem to be one of tying his case to the ventilation conditions existing in the theatre where a given man works. For the convenience of the craft at large there is appended hereto important excerpts from the SMPTE report aforementioned.

It should be remembered that it is not enough that what appears to be adequate ventilation facilities have been installed. Enforcement officials have found that inspection at intervals to check on repair and proper operation is also necessary. Instances are known where ventilation fans have been operated in reverse so as to cause arc fumes to be blown back on the projectionist. Also, flues must be cleaned at frequent intervals.

Significant references to this topic over-all follow.

REFERENCES

[1] COLTMAN, R. W.: "Gases from Carbon Arcs." *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 289.

[2] COLTMAN, R. W., AND MACPHERSON, H. G.: "Gases from Carbon Arcs Absence of Ozone," *Jour. Ind. Hyg. and Tox.*, XX (Sept., 1938), p. 465.

[3] HENDERSON, Y., AND HAGGARD, H. W.: "Noxious

Attention! Roy Brewer and I. A. West Coast Studio Technicians

Decree-law No. 565 endows an Executive Commission for the Film Industry with powers to stimulate Cuban film production. This decree-law authorized the Commission to advance producers up to 33% of the production costs of a film, against subsequent replayment from receipts. In addition to helping finance production costs, this provision of the law in effect underwrites 33% of the producer's losses, should he experience losses.

The law also empowers the Commission to acquire studios and production equipment, to lease these facilities to private producers at low cost, to hire studio personnel as necessary, and to promote the film industry's development in other respects with the funds at the Commission's disposal. It is understood that the Commission's operations will be financed by special drawings of the National Lottery, a source of funds already used to finance construction of the Government-owned "Film City," completed this year in the suburbs of Havana.

The Film City studios have not been put to use so far, because of lack of production equipment there, and also the hesitancy of local entrepreneurs to undertake feature-length film production in the face of the indifferent box-office returns of films previously made in Cuba.

Gases," *A. C. S. Monograph* (1927).

[4] Drinker, P., and Shell, J. R.: "Ventilation of Motion Picture Booths," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 321.

[5] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W. and Bayliss, M.: "Combustion Products of the Carbon Arc," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 312.

[6] MacQuiddy, E. L. Tollman, J. P., LaTowsky, L. W., and Bayliss, M.: "Biological Effects of Inhalation of Carbon Arc Fumes," *Jour. Ind. Hyg. and Tox.*, XX (April, 1938), p. 297.

[7] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W., and Schonbergen, S.: "Tissue Reaction of Some Carbon Arc Dusts," *Jour. Ind. Hyg. and Tox.*, XXI (Dec. 1939), p. 498.

[8] Tollman, J. P., MacQuiddy, E. L., and LaTowsky, L. W.: "Acute Poisoning in Animals after Intraperitoneal and Intratracheal Administration of Dusts," *Jour. Ind. Hyg. and Tox.*, XXI (Dec., 1939), p. 514.

[9] MacQuiddy, E. L., Tollman, J. P., LaTowsky, L. W., and Schonbergen, S.: "Biological Effects of Filtered Arc Gases and Pure Nitrogen Oxides," (*from unpublished ms.*).

[10] Van Wijk, A. M., and Patterson, H. S.: "The Percentage of Particles of Different Sizes Removed from Dust Laden Air by Breathing," *Jour. Ind. Hyg. and Tox.*, XXII (Jan., 1940), p. 31.

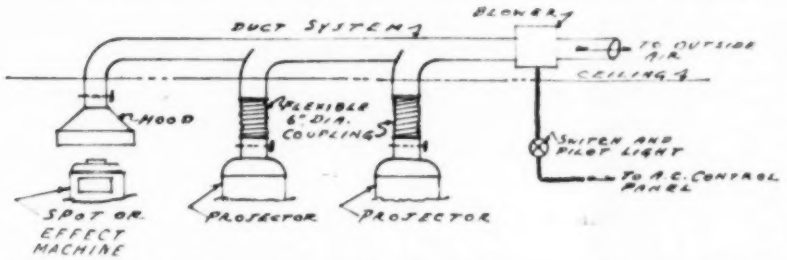
[11] Frederick, W. G.: "A Study of the Motion Picture Industry in Detroit," read before the American Conference on Occupational Disease and Industrial Hygiene, Cleveland, Ohio (1939).

[12] Downes, *A. C.*: "Gases from Carbon Arcs and Their Effects," *J. Soc. Mot. Pict. & Tv. Eng.*, XXXV (July, 1940), p. 32.

Does Your Projection Room Conform?

Approved Projection Room Ventilation

AS FORMULATED BY THE PROJECTION PRACTICE COMMITTEE OF THE SMPTE



Equipment ventilation system: blower capacity 400 cu.-ft. per min.; minimum air movement through lamp houses with blower idle, 15 cu.-ft. per min.

THE projection room proper shall have the following ventilating facilities: (*a*) Carbon arc exhaust (*b*) Fresh air supply, and (*c*) Projection room exhaust, including an emergency exhaust.

The carbon arc exhaust system shall be a positive mechanical exhaust system independent of all other ventilating systems of the theatre. Each projector, spotlamp, stereopticon, or floodlight machine, if of the carbon arc type, shall be connected by a flue to a common duct, which duct shall lead directly out-of-doors.

Reduction of the ventilation to each projector as required shall be accomplished by means of a local damper between the projector lamphouse and the projection room ceiling, and in addition, by means of the damper on the lamphouse proper, if such a control be provided.

This exhaust system shall be operated by an exhaust fan or blower having a capacity of not less than 50 cubic-feet of air per minute for each arc lamp connected thereto. The exhaust fan or blower shall be electrically connected to the projection room wiring system and shall be controlled by a separate switch, with pilot lamp, within the projection room proper.

Minimum Air Circulation

There shall be at no time less than 15 cubic-feet of air per minute through each lamphouse into this exhaust system. Fig. 1 shows the general arrangement. The ducts shall be of non-combustible material, not less than 1 inch thick.

The fresh-air supply to the projection room shall consist of not less than two intake ducts located at or near the floor and at opposite ends of the room, and shall be connected into the main air-supply ducts of the building. *There shall be no connection between this air-supply system and any of the exhaust systems of the projection room.*

It is recommended that gravity-operated dampers connected to the emergency porthole release system be installed in the fresh-air intake registers to prevent smoke from entering the main theatre fresh-air duct system, in case of a fire in the projection room area.

The projection room exhaust system shall be a positive mechanical exhaust system having a normal capacity of not less than 200 cubic-feet per minute and having an auxiliary emergency capacity of not less than 1000 cubic-feet per minute for operation in emergency, *i.e.*, fire. The ventilation system shall terminate in ceiling grilles in the projection room, which shall not be less than two in number. *In no case shall this room exhaust system be connected into any of the ventilating systems of the theatre proper.*

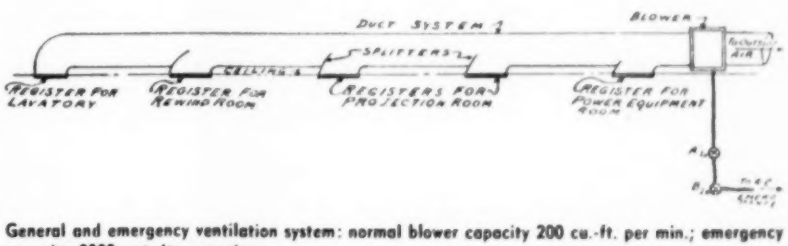
The emergency position of this fan shall be controlled by a switch (Fig. 2) operated automatically by the shutter control system, when the latter is actuated either manually or by melting of the fusible links. This exhaust fan shall be electrically connected to the emergency lighting system of the building. Control shall be provided for manual operation of this fan from a point immediately outside the projection room proper, in addition to the emergency control in the shutter system.

[Note: Elsewhere in the same report The Committee states emphatically that "there shall be no connection between the projection arc exhaust system and any part of the rewind ventilating system."]

Major Opposition to Theatre Tv

Most of the opposition to the plan of the motion picture industry to obtain substantial spectrum space for film theatre Tv is coming from two major groups in the mobile microwave fields. The American Petroleum Institute's Central Committee on Radio Facilities and the National Committee for Utilities Radio have disclosed that they are presenting to the FCC in the theater Tv hearings extensive testimony and significant exhibits to substantiate their positions that microwave systems are vital to their operations and are most important to the national mobilization implementation and the nation's economy.

With the leading electronic-radio manufacturers such as G. E., RCA, Philco, Federal Telephone & Radio, Raytheon and Motorola engaging in extensive development and production programs in microwave, the views of these major industries—as well as that of the military services—undoubtedly are to receive the most serious consideration by the FCC.



General and emergency ventilation system: normal blower capacity 200 cu.-ft. per min.; emergency capacity 2000 cut.-ft. per min.

(A) Switch and pilot lamp for normal operation, inside projection room; (B) switch and pilot lamp for emergency operation, outside door of projection room; also connected to port fire-shutter control mechanism.

(Two or more fresh-air intakes required at or near the floor at opposite ends of the room).

Introducing "Modulation"

By JACK BEHLKE*
Sound Engineer, Motiograph, Inc.

When television picture and sound information comes to the theatre through the air instead of over wires, it arrives piggy-back on a "modulated carrier." Theatre receivers contain some circuits that are tunable to the frequency of the carrier channel, and other circuits that take the information from the carrier by de-modulation. As an introduction to the electronics of modulation and de-modulation, this article outlines the essentials of the amplitude-modulation process that is applied at the transmitter, reversed in the theatre.

WE ALL KNOW that radio and television signals are sent through space between a transmitting station and a receiver in the form of what are called electromagnetic waves. We know also that if the radio or television receiver is to receive a program from a particular transmitter, it must be tuned to the frequency or wavelength of that transmitter. For instance, the signal of a well known transmitting station is 1,000 kc, which means that the radio wave sent by that station has an alternating current of 1,000,000 cycles per second (1,000,000 cycles= 1,000 kilocycles=1 megacycle). As long as the station is on the air, it is transmitting this signal no matter whether there is a program on or a stand-by period. This signal is called the "carrier." It contains the energy and determines the location on the dial for that particular station.

The Unmodulated Carrier

Let us think for a few minutes about this "carrier" and what it is like when there is no program on the air. A radio station usually "warms up" for about one-half hour before its program starts, and you will recall hearing such a warm-up signal. If your receiver has a "magic eye," the eye will close showing that the station is there—you will hear a slight "hm—mm—m-n" in your loudspeaker as you tune in the station, but you will not hear any voice, song, or other program. The reason you do not hear any program is because you are receiving a steady and constant carrier signal. Figure 1 illustrates this signal.

Since electromagnetic waves come fundamentally from a voltage source, we will speak only in terms of a voltage. The current in the antenna, the radiated wave, etc., will be assumed to follow the pattern of the voltage. Figure 1 illustrates a voltage producing the carrier. This voltage starts at zero value, shown by line II, at the left, increases to a maximum negative value, shown by line III, decreases to zero; increases to a maximum positive value, shown by line I, and decreases again to zero. This sequence forms one cycle and takes place in one one-millionth of a second in the case of a 1,000 kc wave.

Owing to the design of the various circuits, the voltage follows a pattern that is called mathematically a "sine wave." A sine wave is not circular, nor elliptical, but is the particular pattern called sine. The distance between line I and line II, or between line II and line III, is called the amplitude of the voltage and represents the maximum positive voltage attained or the maximum negative. The horizontal length of Figure 1 represents time, and if the signal is, as said, 1,000 kc, then the distance between *a* and *b* on the figure represents 1/1,000,000th second.

Now we can conclude two things about the carrier that has no program:

1) It has constant amplitude: e. g., constant maximum voltages.

2) It has frequency; the distance between *a* and *b* is always the same and always represents a time of one one-millionth second.

Modulating the Carrier

Now let us consider the modulation of this carrier wave. The word modulate simply means to change, or to vary. We previously spoke of the carrier having "constant amplitude" and "constant frequency," when there is no program being transmitted; this implies that we can modulate either the amplitude or the frequency, i.e., we can increase or decrease the amplitude of the carrier voltage keeping the frequency constant, or we can increase or decrease the frequency of the carrier while keeping the voltage constant. Either can be done; it is the purpose of this article to discuss the *former* case only, namely, *amplitude* modulation, not *frequency* modulation.

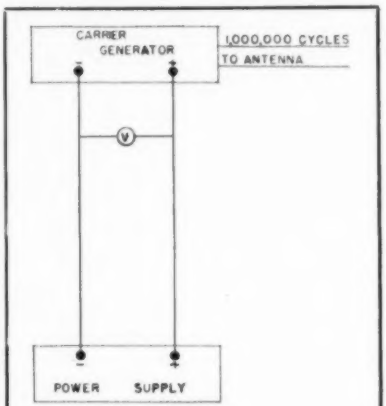


FIGURE 2

In Fig. 2 we have a block diagram of a simple radio transmitter: the top unit is the generator of the radio carrier which converts a DC voltage supplied by the power supply (lower unit) into a high frequency alternating voltage similar to that shown in Fig. 1. This voltage then supplies the antenna which radiates the electromagnetic waves. Such a set-up will produce a carrier without any program. Now if we insert an alternating current generator or a modulator between these two units, as in Fig. 3, we can superimpose a signal upon the carrier.

Let us assume that this generator produces an alternating current voltage of 1,000 cycles per second and that its

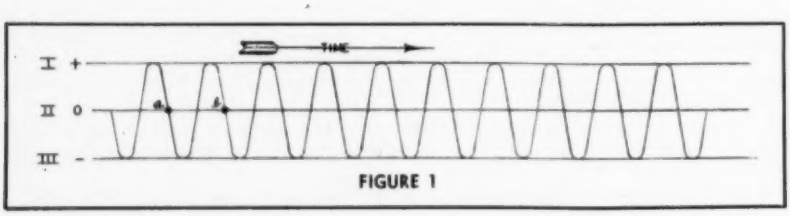


FIGURE 1

* Member, Chicago Local 110

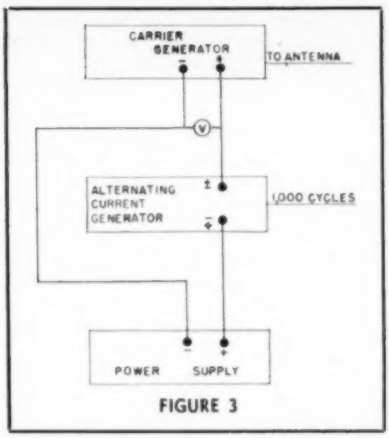


FIGURE 3

maximum amplitude is exactly equal to the DC voltage supply (lower unit), and also that the generator produces a sine wave voltage. Fig. 1 can be considered as representing this voltage also with these facts: (1) that the amplitude between lines I and II or II and III is equal to the DC voltage of the power supply (lower unit), and (2) that the time interval *a* to *b* is one thousandth of a second instead of one-millionth.

As the AC generator voltage builds up from zero, with its top terminal positive, its voltage will *add* to that of the DC power supply, and the voltage measured at "V" will be the *sum* of these two voltages. If the carrier generator is of good design, we can say that it is "linear", and the voltage that it delivers to the antenna will increase as the voltage applied to it increases. Thus at the moment the alternating current generator is producing its peak voltage (which we said above would be equal to that of the DC supply) the voltage applied to the carrier generator will be double, and the voltage applied to the antenna from the carrier generator will also be doubled.

After passing through its peak, the alternating current generator voltage decreases until it reaches zero, at which time only the DC power supply voltage is delivered to the carrier generator, and the voltage into the antenna will be the normal carrier voltage.

Now the polarity of the alternating current generator reverses and the voltage starts to increase, but with the top terminal negative instead of positive. This will mean that the voltage applied to the carrier generator at "V" will be the DC power supply voltage *less* the alternating current generator voltage, and the voltage supplied to the antenna will be *less* than the normal carrier voltage. At the instant the AC generator is producing its maximum negative voltage, the voltage at "V" will be reduced to zero and the output voltage of the carrier generator will be zero.

Under the conditions described above, the carrier is said to be modulated 100%, which is actually determined by the fact that the output voltage is alternately doubled and reduced to zero.

Let us note also that since the voltage of the AC generator has a sine wave form, the peak positive voltage and the peak negative voltage occur for extremely short intervals of time—called instantaneous. The time required for the conditions described in the above two paragraphs to take place is one-thousandth of a second. However, during this time the carrier generator has produced one thousand waves, each one with a slightly different amplitude than the preceding one, sometimes slightly greater, sometimes slightly less. Fig. 4 shows these conditions.

The Modulated Signal

In Fig. 4, the waves represented from A to B form the unmodulated carrier, the same as Fig. 1. From *a* to *b* represents one wave of the carrier. The carrier positive amplitude is measured between lines II and III, the negative amplitude peak between lines IV and III. The effect of the addition of the voltage from the alternating current generator is shown beginning at B, the dash line B to C to D to E to F showing the combined DC power supply and AC generator voltages.

The pattern from B to F represents one cycle of the AC generator voltage, which takes place during one one-thousandth of a second. (Note that if space permitted drawing Fig. 4 realistically instead of only symbolically, the space between B and F would have one thousand waves drawn in instead of the few that the figure shows.) From F to G the carrier again is unmodulated.

Now let us consider the effect of this modulation upon the power radiated. In Fig. 4 carrier power is increased from B to C to D, but it is decreased in the same pattern from D to E to F. If we were to turn the pattern of the increase around, we can see that it would exactly fill in the decrease D to E to F. If the carrier is averaged from B to F, its power is exactly the same as from A and B and unchanged.

Sidebands

But we have added power—we have superimposed the output of the AC generator upon the output of the carrier generator. Where did it go?

The reader may recall driving along a highway and passing a large truck or bus. At the moment of passing he very probably was aware of a throbbing of the two motors. This illustrated a principle of the physics of sound: that if we have two sounds in the same area and they are different in pitch, two additional sounds will be produced, one equal to the sum of the two pitch frequencies, the other equal to the difference of the two pitch frequencies.

In the case of the cars, the reader was able to hear a throbbing equal to the difference between the two frequencies of the two motors. The theory is that any two frequencies superimposed will alternately reinforce and cancel in such a manner that two new frequencies are produced, one equal to the sum, the other equal to the difference, of the two originals.

In television and radio these two new frequencies are called the sideband frequencies. Using the case discussed above, the carrier frequency of 1,000,000 cycles and the AC generator frequency of 1,000 cycles will produce two new frequencies: 1,001,000 and 999,000 cycles per second, called sidebands. Since the power supplied by the AC generator does not cause any increase in the average carrier power, it must be equally divided between the two sideband frequencies. Each sideband will therefore contain one-fourth as much power as the unmodulated car-

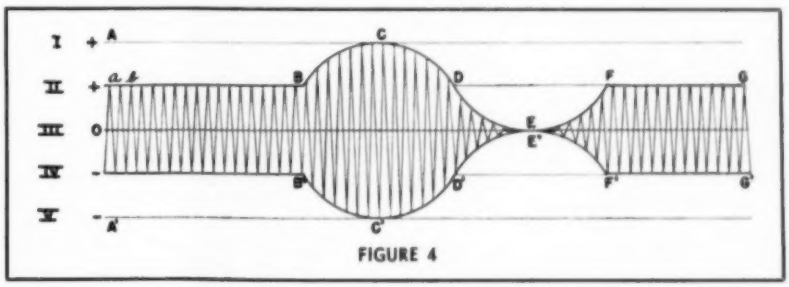


FIGURE 4

rier, and since the power depends upon the square of the voltage, each sideband voltage will be half as large as that of the unmodulated carrier. ($\frac{1}{2}^2$ equals $\frac{1}{4}$).

Details of Practical Application

For the sake of simplicity in presentation, it was assumed above that the "information" which was modulated upon the carrier frequency consisted of a pure 1,000-cycle tone, of sine wave form. In practice, of course, the information which the carrier accepts for delivery to the distant receiver is an extremely complex wave embodying all of the frequencies of the sound to be transmitted (or of the television image to be transmitted).

In practice, therefore, the modulation "envelope"—the distance B to F in Fig. 4—does not normally present the smooth, sine wave form there shown, but a very jagged and irregular pattern which varies in outline from moment to moment with changes in the sound (or in the TV image detail). The general shape of such jagged, irregular sound patterns is familiar to every projectionist who has ever looked at a variable-area soundtrack; and those of TV image modulation are not dissimilar in general appearance.

Amplitude Modulation Only

In closing, it should be emphasized once again that all of the foregoing relates only to *amplitude* modulation. There is also, as noted above, *frequency* modulation, which will perhaps be described herein in a future issue. The processes of de-modulation, as incorporated in the theatre's equipment, vary according to both the type of modulation to be received, and the preferences and judgment of equipment manufacturers.

To the Editor of IP:

Here's my renewal. Still enjoying IP—it's tops. Here's an item: don't know how many other projectionists have noticed it, but why the negative splice marks on most Technicolor release prints? They appear approximately every 2 feet, even without a scene change. Naturally, they can't be seen, being midway on the frame line, but I have noticed these marks on quite a number of Technicolor prints. I might mention that the prints are all American dupes.

I am interested to learn via IP that another major projector manufacturer is working seriously with an airblast onto the aperture. How about taking another leaf out of the Erneman (Zeiss Ikon) copybook and do what they were doing back in 1928—blowing the air onto *both* sides of the aperture via a very simple *water filter?* Zeiss engineers always maintained that the air be properly cooled and cleaned before passing through the jets.

DOUGLAS A. HARLEY
Embassy, Auckland, New Zealand

[These splice print-throughs are caused by splices in the "negative" which prints the frame-lines in silver. Since this "negative" is merely a loop which runs over and over, the image of the splice occurs at regular intervals in the positive print, regardless of scene changes. The length of film in this loop may be ascertained by measuring the length of film in the print between splice marks.

Scene-to-scene changes leave no splice print-throughs in a Technicolor release positive, however, for in color printing the frame-line area is masked off. This procedure would normally leave white (clear) frame-lines. In order to avoid white frame-lines, the Technicolor printing-film contains black frame-lines (as well as a sound-track) in silver image. The black-and-white work is done before the stock is color-printed by the Technicolor process.

Mr. Harley will note that the frame-lines in Technicolor prints are gray, rather than deep black. By printing the silver-image frame-lines lightly, photographic fogging, with consequent encroachment of the frame-line images into the top and bottom of the picture frames, is avoided.—ED.]

To the Editor of IP:

The small bottle on the rewind table that holds the cement for immediate use usually has a cork stopper, with a brush stuck in the cork. After several weeks use, pieces of cork or bristles from the brush will be found in the cement. Replace this bottle with one that has a medicine or eye dropper and a screw-cap top.

These bottles come in brown glass which keeps out the light that effects some types of cement, and they may be obtained for a few cents from any drug store. The tops are made of plastic and have a rubber seal, with the dropper fixed to the top. A little practice with the dropper rubber bulb and you will be able to apply the right amount of cement to make a good splice. The cement is always clean and kept air-tight when not in use.

Although Cinerama may be the shot in the arm the movies need, it seems to me that the high costs involved put it far out of reach of neighborhood and small-town theatres. Isn't it possible to project Cinerama with three 16-mm projectors (with arc lamps) on a curved screen smaller than the 64' x 23' screen now in use, employing, of course, the same angle of vision—146 x 55 degrees? The smaller picture size necessary from each projector should provide sufficient light from a 16-mm projector. It is quite likely, however, that this would call for some research on screen surfaces in order to keep down interfering reflection from each projector, which is bound to be greater with a smaller screen when curved.

K. C. BRIDGES
Exeter, Ont., Canada

[Possible to utilize 16-mm for an effect similar to that achieved by Cinerama, but such a setup wouldn't have the vast sweep and scope of present 35-mm equipment—in short, it wouldn't *awe* the customers. Cement bottle tip sounds like a good idea.—ED.]

To the Editor of IP:

Thought you might be interested in carbon-handling pliers which I bought about 16 years ago. I have been told that they are called "battery" pliers. When I saw them in the window of a hardware store I didn't ask what they were called; I knew immediately that they would be ideal for handling carbons. And they sure are. The maker's name is not on them—they are stamped only "Blue Bird No. 12 USA."

H. Y. BALLOU
Member, IA L. 150, Los Angeles, Calif.

[Blue Bird pliers are made by Bergman Tool Mfg. Co., Inc., 1573 Niagara St., Buffalo 13, N. Y., which advises that the No. 12 model has not been made for the past 15 years. However, similar models are available.—ED.]

RCA's 3-D Projection Kit

RCA has announced a kit containing all materials required to synchronize two projectors for presentation of 3-D motion pictures. Also, it was announced that tests have shown the RCA seamless silver screen to be well-suited for 3-D showings. These items, as well as the new extra-wide RCA Synchro Screens, are included in the company's complete 1953 line of indoor theatre and drive-in equipment. The "Synchro Screen" enhances the illusion of spectator participation in the screen action, it is pointed out, by providing illuminated side and top panels which extend peripheral vision.

Types of Theatre Sound Reproducers

This is the second of a series of articles analyzing the essential nature of devices that convert sound records into electrical currents. Two general types of these devices, the disk reproducer and the soundhead, are used in theatres at present, while the magnetic reproducer is growing increasingly popular for 16-mm projection.

II. The Variable Reluctance Pickup

By ROBERT A. MITCHELL

VARIABLE reluctance pickup is the descriptive term applied by its manufacturer to a special form of magnetic reproducer designed for particularly excellent quality. As the name implies, the device operates via variations in the reluctance (magnetic resistance) of the flux path, produced by needle vibration. A special feature of this unit is the exceptionally slight mass of the moving element. Because of this, quality can be excellent but output must be very weak; in fact, a two-stage pre-amplifier is needed.

The variable reluctance pickup, a General Electric product, has been made available in several models, including a triple-turret type that can be adjusted to play either 33-1/3, 45, or 78 rpm records by simply turning a knob. Sapphire or diamond styli are used.

The Crystal Pickup

The crystal pickup is an alternating-current generator. Certain kinds of crystals have the amazing ability to generate a pulse of current when subject to a twisting, or torsional, strain. Most commercial pickups employ crystals of potassium sodium carbonate, more commonly known as Rochelle salt.

Figure 2 illustrates the construction of a commonly used make of crystal cartridge. Note that the movements of the needle are transferred to the stiff metal band which holds the flat slab of Rochelle salt. Because the two ends of the band are not connected except by the rotary-vibrating needle-holding shaft, the band, and hence the insulated and moisture-proofed tablet of crystal it holds, twists slightly as the needle moves from side to side in the wavy record-groove. Strips of copper foil fastened to opposite sides of the crystal pick up the tiny currents generated by the crystal and conduct them to the terminals of the cartridge.

The cartridge is tightly sealed and cannot be taken apart without completely ruining the unit. Damaged or worn-out crystal pickups cannot be repaired by anyone; so if the crystal gets fractured by dropping the pickup, or deteriorates through the effects of heat, dampness, etc., only a new cartridge will restore the phonograph. Fortunately, crystal cartridges are not too expensive, and their replacement in the tone-arm of the reproducer is a very simple operation.

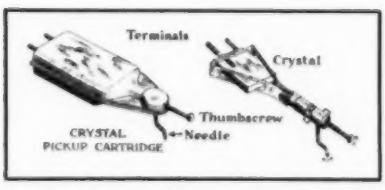


FIG. 2. A crystal pickup cartridge. The small arrows in the right-hand drawing indicate the vibratory movements of the needle and its holder. Because the metal band is anchored only at its end, vibration of the needle imparts to it and the crystal of Rochelle salt the twisting motion which generates current.

Crystal Pickups Not Rugged

A crystal pickup is not the most rugged device in the world. It will stand just so much abuse, and no more. Should the crystal shatter, through rough handling, the pickup will give no sound except a harsh grating noise. If kept at temperatures in the neighborhood of 100 degrees Fahrenheit, the crystal will quickly deteriorate. At 125 degrees it spontaneously turns to powder, and at slightly higher temperatures the salt melts.

When well cared for, a crystal pickup will give good results for several years in cool, dry climates. Progressive loss of volume and noticeable attenuation of the low frequencies, resulting in weak, "tinny" sound, are good indications that the cartridge is about to expire.

The frequency-response of a new crystal pickup is very good over the entire range of reproducible frequencies (40 to 8,000 cps), but the type of needle used and the electrical characteristics of the input circuit influence the reproduction of bass and soprano tones. Because of this fact, however, we are able to obtain the type of response which gives the most natural and pleasing reproduction of disk records.

Pickup Connection

Inasmuch as the crystal pickup is a high-impedance device, it may be connected directly to the grid of the input tube of the amplifier. In practice the pickup is connected to a 500,000-ohm load resistance, and the voltage-drop developed across this resistance is applied to the tube. Since the volume-control potentiometer of the system has a resistance of this order, one lead from the pickup may be connected to the "hot" end-terminal of the potentiometer, the other pickup-lead being connected to the grounded end-terminal of the potentiometer—or simply to the "floating ground" of the amplifier. These connections are shown in Fig. 3.

In a motion-picture sound amplifier the first voltage-gain stage is a pre-amplifier for the photoelectric cells of the sound-on-film reproducers. The crystal-pickup output is usually introduced into the system at the second voltage-gain stage—the stage follow-

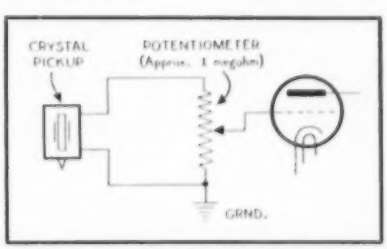


FIG. 3. This diagram shows how a crystal pickup is connected to an amplifier. No input transformer is necessary because the electrical impedance of the crystal is very high.

ing the preamplifier. A crystal pickup furnishes an enormously more powerful signal-current than a photocell does.

Over-amplification must be guarded against, for if the amplitude of the incoming signal is too great for the grid of the tube to handle, the modulated plate current will not be an exact facsimile of signal generated in the pickup. This means that distortion will arise; and it happens that this is "even-numbered harmonic distortion," which sounds pretty awful. (Music will be a harsh jumble of sounds, and voices will sound as they might in Bell's first telephone.)

Reproducer Circuitry

But if for some reason the output of the crystal pickup must be fed to the preamplifier (as is sometimes the case with small theatre amplifiers when an especially "boomy" bass is desired), several important safeguards must be observed.

1. Photocell bias, or polarizing, voltage must be kept out of the crystal pickup by means of a small condenser in series with the "hot" pickup-lead.

2. Excessively strong signal to be avoided by shunting the pickup-leads (on the pickup side of the series condenser) with a resistor, a condenser, or both in parallel, depending on the frequency-response characteristics desired.

3. A *double-throw* "Film-Disk" switch must be placed in the pickup circuit on the photocell side of the series condenser. The switch should be installed in the preamplifier cabinet in order to avoid long leads and the resulting capacitance which attenuates high frequencies. If such a switch is not installed, sound-on-film reproduction will suffer from loss of volume and poor high-frequency response.

4. Lead-wires from the amplifier to the phonograph pickup should be in shielded cable to avoid noise and hum.

External Modifications

Most modern amplifiers have built-in phonograph and microphone input jacks, however, making it unnecessary for the projectionist or service engineer to tap into the system. But in any event, certain pickup-circuit modifications may be made external to the amplifier in order to change the response of the pickup.

If, for example, the sound from the disk reproducer is too harsh and metallic, giving evidence of excessive high-frequency response, a small condenser (about 0.002 microfarad) may be connected in shunt with the pickup, as shown in diagram A of Fig. 4. Such a condenser is called a "scratch-filter" because in slightly reducing the high-frequency response it decreases surface noise.

A scratch-filter condenser is much more effective when connected from the plate of the first amplifier tube to the floating ground of the amplifier; but this "internal" hookup should not be made because it would cause the sound-on-film reproduction to sound muffled and indistinct.

If the sound from the phonograph seems thin and "tinny," the low frequencies are not being amplified enough in proportion to the higher frequencies. This condition can be corrected, if the amplifier has sufficient gain, by connecting a resistor of from 500,000 to 5,000,000 ohms in series with the "hot" lead of the crystal pickup; and the higher the ohmic resistance, the greater will be the reduction of high frequencies in proportion to the low.

Simple Equalizing Circuit

In fact, a 1-megohm (1,000,000-ohm) resistor will give a nearly flat, or even, response from 40 to 6,000 cps; while a 5-megohm (5,000,000-ohm) resistor boosts the bass response to give a "boomy" quality of reproduction and very little surface noise. The risk here is that the sound may be muffled too much. Diagram B of Fig. 4 shows the hookup.

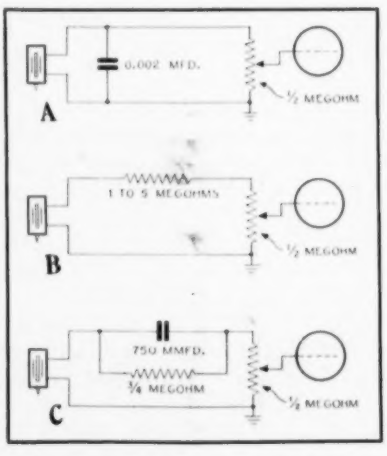


FIG. 4. Crystal-pickup circuit modifications. The use of a small condenser to filter out needle scratch or surface noise. (B) Improving bass response by adding a resistor to increase terminal impedance. (C) Conforming bass response to the characteristics of commercial phonograph records by means of a simple equalizing circuit.

Response curves of a popular make of crystal pickup reveal a slight unevenness in the bass response from 40 to 300 cycles. While these inequalities are almost too slight to matter, it is interesting to know that a simple equalizing circuit smooths them out to give a more uniform low-frequency response which conforms closely to the response of commercial disk records of good quality. Diagram C of Fig. 4 illustrates the compensating circuit. Connect a 750-micromicrofarad condenser in series with the pickup "hot" lead, and shunt this condenser with a 750,000-ohm resistor.

Needle or Stylus

As said before, the needle has something to do with the frequency-response of the pickup. Since crystal pickups are very light—the needle-pressure on the records being ¾ to 1¼ ounces — semi-permanent needles can be used in them. To be sure, such needles *should* be used in crystal pickups. They are more accurately made than the ordinary steel needles, and they eliminate frequent needle-changing with attendant risk of fracturing the crystal.

A truly permanent stylus, however, is a non-existent animal, despite the claims of certain needle-manufacturers to the contrary. Don't let anyone tell you that a "last-forever" needle has or can be made. The diamond is the hardest substance known; and even a diamond-point needle wears out in time, developing a flat spot which distorts sound.

Although the diamond stylus outlasts other kinds, it is not recommended because (1) it shatters very easily, and (2) the diamond point lasts only two or three times as long as the sapphire stylus which it exceeds in price by as much as 15 times.

The reason why diamond points cost so much is not because the diamond is a rare gem. The cheap and discolored carbonado diamonds used for phonograph needles are actually worth about a nickel apiece in the uncut state. It is the process of polishing the point with diamond dust on a lapidary's wheel that accounts for the cost. Sapphires, on the other hand, can be quickly and cheaply flame-polished after preliminary rough grinding with inexpensive abrasives. Diamond can-

(*Continued on page* 29)

IP SERVICE BUREAU

Questions relating to any phase of motion picture technology of interest to the projectionist craft generally are solicited for this department. The answers thereto will be forthcoming promptly. Each topic discussed will bear an index number for easy reference and, if so desired, inclusion in a compendium.

101. Ansco Color Film: Color Balance, Definition

I should appreciate clarification of several points made in the article "The New Ansco Color Film and Process," by Robert A. Mitchell, in IP for December last (p. 13). I have had experience with Ansco Color prints as used in the U. S. Air Force training program, and I find that good focus is something to be desired rather than, as the article states ". . . development insures extremely good image-definition. Furthermore, the non-diffusing characteristics of the dyes safeguards this excellent definition . . ."

I issume that the prints I mention were originally photographed on 35-mm film and that optical reductions were made for release prints, although the color balance and definition is not up to par.

S/Sgt. Wesley Bright, Senior Specialist, Film Exchange, Ramey Air Force Base, Puerto Rico.

I ASSUME that the films referred to are Ansco Color 16-mm prints; prepared by reduction-printing from 35-mm originals. I cannot, however, venture a guess as to whether the 35-mm films used for printing were duplicate negatives in full color, master positives in full color, black-and-white separation negatives, or black-and-white separation positives. Such information would greatly facilitate trouble-shooting, as the printing of color film is a very critical operation. A clip from an offending film might provide a definite clue.

I am sure that the trouble definitely does *not* originate in the Ansco Color film itself. The statements I made in my article, *viz.* that the cyan, magenta, and yellow dyes are formed in the closest contact with the silver grains produced during development, and that the Ansco Color dyes are non-diffusing in character, are really true. In fact, the "resolving power" of Ansco Color Type 848 35-mm and Type 248 16-mm positive printing films is consistently 55 to 60 lines per mm.

It can thus be seen that the image-definition obtainable with Ansco Color compares favorably with that of panchromatic black-and-white emulsion, and is of the same order as that obtainable with Ektachrome, Warner Color, Agfacolor, and other multilayer "monopack" color films.

Fault in Taking, Processing?

When Ansco Color prints are made directly from color negatives, either by contact or by optical projection printing, any poor focus appearing in the prints must be due either to poor photography or to inexpert handling of the printing process. Because the three color emulsions of Ansco Color are combined to form a single "pack" which is only a trifle thicker than ordinary black-and-white emulsion, there is no undue optical diffusion in the emulsion itself.

There are no registration problems in simple Ansco Color printing, of course. Registration problems are introduced only when the color prints are prepared by a process which involves the use of three black-and-white separation films, one being the "red record" (printed cyan); the second being the "green record" (printed magenta); and th third being the "indigo record" (printed yellow.

Ansco Color theatre-release prints are printed from duplicate color negatives prepared by triple exposure to black-and-white separation positives through red, green, and indigo filters. This method was used for making the 35-mm Ansco Color prints of M-G-M's "The Wild North," which you have probably already seen, and M-G-M's "Vaquero," soon to be released.

Separation-Print Method

The separation-print method possesses many distinct advantages for professional work, one of them being great flexibility in color and density control; but it should not be used by laboratories not completely equipped with the most modern apparatus for handling this more complicated step. The three color-record images from the separation films must be *exactly* superimposed, the slightest deviation from perfect registration affecting adversely image-definition.

Image definition in all trichromatic natural-color films is determined primarily by the green record, represented by magenta dye in the color films. It is therefore imperative that particular care be taken in all duplication steps to preserve maximum possible definition in the green record and magenta image.

It is entirely possible that the image-definition of the Ansco Color reduction prints to which you refer deteriorated in the optical reduction-printing process. It not infrequently happens that even black-and-white 16-mm reduction prints from 35-mm masters of good quality suffer from fuzzy focus. The success of optical printing depends not only on the quality and condition of the projector-

(*Continued on page* 33)

25-30 CLUB HOLDS INSTALLATION OF NEWLY ELECTED OFFICIALS

The Club's official family for 1953. Left to right: Tony Boscarelli (member, Local 384, Hudson Co., N. J.), elected trustee to serve three years; Abraham Kessler (treasurer, N. Y. Local 306), vice-president; John Krulish (member, Local 306, and field service supervisor for National Theatre Supply), president; Morris J. Rotker (member, Local 306), installing officer; Edward J. Dougherty (member, Local 384, Hudson Co., N. J.), incumbent; Abe Seligman (member, Local 306), sgt.-at-arms; Benjamin Stern (member of board of trustees, Local 306), re-elected financial-secretary and treasurer; and Morris I. Klapholz (member of Local 306 retirement board), reelected recording and corresponding secretary.

IN THE
SPOTLIGHT

FIRST official act of the Harry Sherman Memorial Heart Fund, founded by the 25-30 Club, Inc. of N. Y., was the presentation at the January meeting of the Club of a beautifully engraved scroll of the original resolution establishing the Fund to the widow of the late conductor of IP's "In The Spotlight" columns. IA President Richard F. Walsh made the presentation to Harry Sherman's brother, Isadore, who accepted it on behalf of Mrs. Sherman.

In making the presentation, President Walsh said:

"I am glad to be asked to do something for the memory of a man who did a lot for the 25-30 Club. Those who knew him can't say anything but the best about Harry Sherman. I knew Harry and I knew him well. He would go out of his way to help you. Maybe that's why the fellows in the 25-30 Club thought so much of him. If you look back through the record, you will also find it written that a man named Harry Sherman did many, many good things for the IA and for the members of his Local 306."

The scroll was conceived and executed under the personal supervision of Judge Nathaniel Doragoff, member of N. Y. Local 306, who is the referee for the New York State Compensation Commission.

Morris J. Rotker, past president and one of the Club's organizers, presented President Walsh with the first check to be drawn on the Harry Sherman Memorial Heart Fund as a contribution to the Will Rogers Memorial Foundation. The IA head is a vice-president of Will Rogers Hospital at Saranac Lake, N. Y., for which the amusement industry is now conducting a vigorous fund-raising drive.

About 350 people assembled to pay tribute to the memory of a man whose loyalty and willingness to lend a helping hand to his fellow-men are so well known to his many friends in and out of the industry.

IA President Walsh (right) presents the Harry Sherman Memorial Heart Fund scroll to Isadore Sherman.

Among the out-of-town guests, introduced by Rotker, were Charles Wheeler, secretary of the N. Y. State Assoc. of Motion Picture Projectionists and member of Local 108, Geneva, N. Y.; Al DeTitta and Ralph DeMea, vice-president and business representative, respectively, Local 384, Hudson County, N. J., and Harry Lackey, business representative, Local 337, Utica, N. Y.

Others introduced by Rotker included Arthur Meyer, vice-president of International Projector Corp.; Allen G. Smith N. Y. City branch manager for National Theatre Supply Co.; Dave Joy and Paul Reis of National Carbon Co., and also Bill Kunzmann, recently retired from the same organization.

Also present were Harry Garfman, Brooklyn business representative for N. Y. Local 306; Charles Eichhorn, Edgar T. Stewart, and Dick Cancellare, members of Local 306 executive board; Isadore Schwartz, Local 306 financial-secretary; Charles Muller, chief projectionist at Radio City Music Hall; Charles Kellner, projection supervisor at RCA's preview theatre; Vincent Jacoby, president of N. Y. Local 1, and 25-30 Club old-timers Mike Berkowitz, Harry Mackler, and Al Kaye, all past presidents.

Resolution

ADOPTED BY

25-30 CLUB, INC., OF NEW YORK

WHEREAS: in the passing of

HARRY SHERMAN

the 25-30 Club, Inc., has suffered a great and irreparable loss and will miss his stimulating leadership, inspiring eloquence, wise council, kindly humor and helpful participation in the many activities of the Club and contributed so much to its growth and progress, and

WHEREAS:

HARRY SHERMAN

was a pioneer member of Local 306, holding thru the years many important offices, including that of President; and later as Assistant President of the International Alliance of Theatrical Stage Employes and Motion Picture Machine Operators' Union of the United States and Canada, winning in these positions the respect, regard and admiration of its members, and

WHEREAS: a committee has been appointed by the 25-30 Club, Inc. to assist in the campaign for Research that will lead to a reduction of Cardiac Diseases, and the Relief of its members suffering from this widespread and terrible affliction, therefore be it

RESOLVED: that in order to carry out the purpose of this committee, and as tangible evidence of our esteem, the HARRY SHERMAN MEMORIAL HEART FUND of the 25-30 Club, Inc., be created, and be it further

RESOLVED: that a copy of this Resolution be engrossed and presented to his beloved wife, Ruth E. Sherman.

• At a regular meeting of IA Local 110, Chicago, held on February 5 last, Eugene J. Atkinson was re-elected Business Manager, and Clarence A. Jalas was re-elected Secretary-Treasurer, both for five-year terms. The terms of office for the balance of the officers will expire in February, 1954.

Eugene J. Atkinson

• The dispute between Pittsburgh Local 171 officials and the Warner Theatre management relative to the proper classification of the 3-dimensional picture "Bwana Devil" has aroused considerable interest throughout the industry. It is the contention of James V. Sipe, business representative of the Local, that the showing of 3-D films requires more work and skill on the part of projectionists and that the men are entitled to more pay. Local 171 claims that this

Morris J. Rotker (right), past president of the 25-30 Club, presents IA President Walsh with the first check drawn on the Harry Sherman Memorial Heart Fund for the Will Rogers Memorial Foundation.

new medium is not covered in its contract with the circuit. The matter has been deferred to the IA General Office for further clarification. Whatever the decision, it will be retroactive to the opening of the film.

• A fire that originated in the projection room of the Wisconsin Theatre, in La Crosse, Wis., completely demolished the building in which it was housed. Fortunately, the theatre was empty when the fire broke out and there were no casualties.

• In an effort to thwart off the invasion of TV, Mexico's projectionists have organized to develop 3-dimension films. Although the only TV stations in Mexico at present are those located in the capital city, many applications have been received for permits to operate along the American border.

• We are sorry to learn of the illness of George Harris, one of the veteran members of Milwaukee Local 164. We wish him a speedy recovery.

• *Recent out-of-town visitors to the offices of IP*: Eddie Miller, IA representative and business representative for Local 279, Houston, Texas, and R. E. "Rut" Morris, IA trustee and business representative for Local 142, Mobile, Ala.

• Morris J. Rotker, member of N. Y. Local 306 and the 25-30 Club, was recently re-elected chairman of the Bronx (NYC) Local School Board. He was also re-elected treasurer of Samaritan Lodge No. 1035, F. & A. M.

• The next regular meeting of the IA General Executive Board will be held at the Last Frontier Hotel, Las Vegas, Nev., on Monday, March 2.

• Thomas J. Shea, 53, assistant president of the International Alliance died January 14 at the Will Rogers Memorial Hospital, where he had been a patient for several months.

Shea was a native of Middletown, Conn. and joined the IA in 1918. He was business representative for Meriden-Middletown Local 350 from 1926 to 1933, later taking over the same office for the newly-chartered Middletown Local 375. Prior to his appointment as IA assistant president in 1943, Shea held office in the Connecticut State Federation of Labor. He was a member of the Connecticut legislature, serving from 1934 to 1938, when he was appointed appeals commissioner in the State Department of Labor, where he remained until 1940. In 1943 he was appointed IA representative by President Walsh, and was advanced to the office of assistant president in 1945.

He is survived by his wife, Alice; his mother, two daughters, one son, and three grandchildren.

• The University of California will hold its first classes in television one night each week beginning February 1953. The course is called *Television Principles and Practices*.

• The long-drawn out negotiations between New York Local 306 and the New York metropolitan and first-run Broadway houses seem to have struck a snag. Discussions have been going on since September 1952, when the old contracts expired, and the present stalemate is said to be causing considerable dissatisfaction in the ranks of 306. The Local is seeking an overall 15% increase, 13% of which is a direct wage hike and 2% for the welfare fund. Also, for the first time in their discussions with the exhibitors, Local 306 officials have introduced the subject of extra pay for preparatory time.

• A midnight banquet on January 23 marked the 34th anniversary of Local 386, Columbus, Ohio. Many special guests, including top IA officials, attended the celebration.

• The month-old strike called by Los Angeles Local 150 against the 18 drive-ins operated by the Pacific Drive-In Theatres chain, ended recently with a compromise settlement. Local 150 sought to place two projectionists per shift in each of the drive-ins playing first-run pictures. The compromise settlement pro-

JOE CROW, CHARTER MEMBER, HONORED BY LOCAL 421, HERRIN, ILLINOIS

A lifetime membership card in Herrin Local 421 was recently presented to Joe Crow, member of the Local since 1914. Crow was born in 1883 and is said to be the oldest living projectionist in Southern Illinois. He is at present working at the Fox Globe Theatre in Christopher, Ill.

Top photo shows Crow holding the life membership card which was presented to him on behalf of the Local by Gus Dulumbeck (standing next to him), executive board member. In the background are Kenneth G. Alley (left), trustee, and (right) James H. Park, recording-secretary. Center and bottom photos show the officers and members of the Local gathered at the party.

Harry Garfman (center row, second from right), and Izzy Schwartz (extreme left, same row), sponsor a party for the patients of St. Giles Hospital in Brooklyn.

vides for the two-man shift in four of the drive-ins showing first-runs, and for a 25c per hour increase over the basic scale for the men working single shifts in the other drive-ins when first-runs are shown. IA President Walsh and George Schaffer, Local 150 business representative, were in charge of negotiations for the Local.

• For many years Harry Garfman, Local 306, Brooklyn business representative, has taken an active interest in the rehabilitation of underprivileged children. He is aided in this work by the Movie Social Club of Brooklyn, comprised of Local 306 members. In addition to lending financial aid to various worthy causes, the Club puts on free weekly picture shows, stages Christmas parties for the patients of a number of Brooklyn hospitals.

IA ELECTIONS

LOCAL 48, AKRON, OHIO

Stanley Fritz, *pres.*; Karl Hermann, *vice-pres.*; Hal Claflin, *sec.*; Charles Hermann, *bus. rep.*; Arthur Anderson, H. B. Claflin, John S. Botts, and Marvin Harlan, *exec. board*.

LOCAL 253, ROCHESTER, N. Y.

Louis Levin, *pres.*; Bert Blackford, *vice-pres.*; Lester D. Barager, *sec.*; Leon Burton, *treas.*; Allen J. Tindal, *bus. rep.*; Robert Cragg, Abe Orden, Charles Mason, Jr., *exec. board*; C. Mason, *trustee*; Joseph Vecchio and A. Orden, *del. Rochester AFL Central Trades and Labor Council*; John Copple, *sgt.-at-arms*.

LOCAL 257, OTTAWA, ONT., CANADA

James P. McGuire, *pres.*; John Macauley, *vice-pres.*; W. Murray Hall, *sec.-treas.*; William H. Hartnett, *bus. rep.*; E. Field, L. Lamothe, L. Simpson, *trustees*, and S. Ventura, *sgt.-at-arms*.

LOCAL 332, CLINTON, IOWA

Harold C. Andrews, *pres.*; James Wosoba, *vice-pres.*; A. E. Hubbard, *sec.*; Tom Mellen, *treas.*; Paul Nadelhoffer, *bus. rep.*; Eugene Boos, *exec. board*; Wosoba, *sgt.-at-arms*; Nadelhoffer and Hubbard, *del. Clinton Labor Congress*.

LOCAL 348, VANCOUVER, B. C., CANADA

Alf McManus, *pres.*; Wm. McCarthy, Jr., *vice-pres.*; James Baldwin, *sec.*; Frank Smith, *treas.*; Ray Wardrop, *rec.-sec.*; Les Walker, *bus. rep.*; Nip Gowen, Jr., *member at large*.

LOCAL 376, SYRACUSE, N. Y.

Louis R. Boyd, *pres.*; Melvin A. Denny, *vice-pres.*; George F. Raaflaub, *sec.*; Lionel B. Wilcox, *fin.-sec. and treas.*; Walter M. Scarfe, *bus. rep.*; Kenneth D. Wilcox, *sgt.-at-arms*; Lawrence F. Sherman, Harry C. Burley, *exec. board*; Charles R. Nelson, John H. Eccles, Adolph Den Haese, *trustees*; Philip T. Rossomando, *del. Central Body*; George Doss, 16-*mm bus. rep.*, and Warren E. Williams, *chairman*, 16-*mm*.

LOCAL 380, OKLAHOMA CITY, OKLA.

Berlin Parks, *pres.*; *Robert* Croasdale, *vice-pres.*; Bert Bell, *fin.-sec.*; Jerry Jeter, *rec.-sec.*; Kenneth Lyons, *bus. rep.*; John A. Cole, *sgt.-at-arms. Board of trustees*: Omar Woodard, *chairman*; J. O. Buckles, and Alva Lyons, Sr.

LOCAL 386, COLUMBUS, OHIO

Donald V. Gardner, *pres.*; H. Meade Feather, *vice-pres.*; David R. Cornwell, *sec.-treas.*; Calvin Beard, *fin.-sec.*; Bill W. Weltz, *rec.-sec.*; Ned R. Welch, *bus. rep.*; Paul Wareham, *trustee*; William Constans, *health and accident trustee*; and Willis S. Persons, *sgt.-at-arms*.

LOCAL 407, SAN ANTONIO, TEXAS

W. R. Tin . *pres.*; Alfred Pena, *vice-pres.*; Henry . Villapadierna, *sec.-treas.*; Horace E. Bla n, *rec.-sec.*; W. B. Keeler, *bus. rep.*; Phill N. Wehrmann, and Manuel Ayala, *member at large*.

LOCAL 586, COLUMBUS, NORFOLK, GRAND ISLAND, HASTINGS, AND YORK, NEBR.

W. E. Snyder, *pres.*; F. L. Kerwood, *vice-pres.*; Conrad Krieger, *sec.*; Louis Christofferson, *treas.*; E. O. Hart, *fin.-sec.*; Leo Tews, *bus. rep.*; Fred Driskell, *exec. board*; Clayton Yost, R. R. Kerwood, Alva Brooke, *trustees*, and O. P. McCurdy, *sgt.-at-arms*.

LOCAL 599, FRESNO, CALIF.

Fred Carbine, *pres.*; Paul Ausbrook, 1*st vice-pres.*; Mickey Irvin, 2*nd vice-pres.*; Charles Busby, 3*rd vice-pres.*; Frank Letlow, *rec.-sec.*; Ottie Junkins, *fin.-sec.*; Dallas Page, *bus. rep.*; Eddie Murphy, *wage scale committee*; Bill Willis, *trustee*; Jack Gleim, *del.* and Len Rader, *alternate del. State Theatrical Federation Convention*; Jerry Viele, *del. Labor Council*, Ferol Decker, *sgt.-at-arms*.

LOCAL 735, MT. CLEMENS, MICH.

Fritz Devantier, *pres.*; Bert Penzien, *vice-pres.*; Norman Pingel, *fin.-sec.*; Earl Natzel, *cor.-sec.*; George Konath, *treas.*; Roy Suckling, *bus. rep.*; Shorty Bushard, *sgt.-at-arms*.

PERSONAL NOTES

E. Allan Williford has been elected president of Link Aviation, Inc., Binghamton, N. Y. He succeeds Edwin A. Link, founder, who continues as chairman of the board and director of research. Mr. Williford has been vice-president and general manager of the Link firm since February, 1950. A graduate of the University of Illinois and a veteran of World War I, he was previously general sales manager of the Carbon Products Division of National Carbon Co.

George Friedl, Jr., v-p of Technical Industries, Inc., Pasadena, Calif., has been named works manager of Link Aviation, Binghamton, N. Y. Friedl has been active in the precision instrument field for more than 20 years, notably with General Precision Equipment Corp. as director of engineering for International Projector Corp. and, later, as president and director of Librascope, Inc., of Burbank, Calif.

Friedl was associated with Western Electric from 1928 to 1937, where he was active in the design and manufacture of many components of the W. E. sound system. He also developed a sound system for IPC and has charge of its production.

Blair Foulds has been elected a vice-president of General Precision Labs, Pleasantville, N. Y., a wholly-owned subsidiary of General Precision Equipment Corp. He has served for several years as director of commercial engineering for the company, with special emphasis on the marketing of broadcast studio and theatre Tv equipment.

A. John Platt has been named manager of theatre equipment sales for RCA Victor. He succeeds M. F. (Marty) Bennett, who has been advanced to RCA's regional management staff.

Mr. Platt's entire business career has been devoted to theatre service and sales activities. Joining RCA in 1941, following schooling at the University of Pittsburgh, he was assigned to theatre service. He functioned in this capacity until 1948, except for service in the U. S. Navy during World War II. In 1948 he joined Midwest Theatre Supply, of Cincinnati. In 1949 Mr. Platt rejoined RCA as a theatre field sales representative. He is a member of the Variety Club and of the SMPTE.

Use of RCA's "400" 16-mm recorder-projector (IP for June, 1952, page 23) is explained and dramatized in a full-color, sound, 12-minute, 16-mm film entitled You Are the Producer, available through RCA's Visual Products distributors or through the Engineering Products Department at Camden, N. J.

Ideal Pictures Corporation has issued a 32-page 1953 Entertainment catalog listing more than 1,000 16-mm sound films, including titles well-known in 35-mm entertainment, and a large number of free sponsored films. Copies of the catalog are available from any of Ideal's 27 local offices.

RCA Unveils Transistor Units

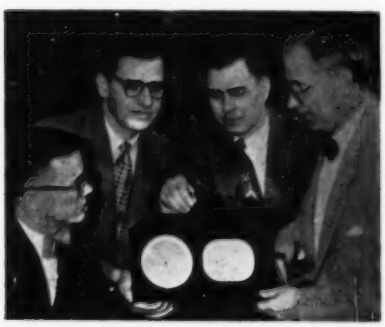
Audio amplifier, TV receivers, radio receivers, public address systems, adder and computer, record player and related items, all using transistors instead of vacuum tubes, are demonstrated to the press at RCA's laboratories at Princeton, N. J.

A SPEECH amplifier consisting of four transistors and no output transformer was among the more than a dozen items of electronic equipment recently demonstrated to electronics industry executives by RCA's David Sarnoff Research Center at Princeton, New Jersey.

A few of them are illustrated here. For example, the automobile radio chassis (seen in the hands of D. D. Holmes of the Center) operates directly from the car battery without any vibrator to produce high voltage. There are no tubes in it: it utilizes 11 transistors instead, and each of the transistors is a low-voltage device. The power inefficiency of the vibrator and associated circuits being eliminated, the drain imposed on the battery by this radio is only 10 percent of the usual automobile radio battery drain.

Improved Performance, Low Cost

Excellent quality in audio sound will assuredly cost less if the type of transistor-amplifier demonstrated at Princeton comes into general use, since the most expensive single component in the average high-quality amplifier is the output transformer. Inexpensive types of output transformers introduce distortion. The transistor-amplifier has no output transformer at all—unlike the vacuum tube, the transistor is a low-impedance device that can work directly into the loudspeaker voice coils. Circuitry of the amplifier demonstrated has not as yet been revealed in detail, but it was stated to contain only four transistors and virtually nothing else.



Laboratory staff members gather round their new all-transistor portable Tv receiver. It measures approximately 1 x 1 x ½-foot, weighs 27 pounds, draws 14 watts from built-in batteries; has range of 15 miles with small antenna, 5 miles with built-in antenna. It contains no tubes except the 5-inch picture tube. RCA also displayed a home receiver, having a 17-inch picture tube, with some operating tubes and some transistors.

The portable TV receiver pictured here contains no tubes except the 5-inch viewing tube. Transistors have been substituted for all the others. It weighs 27 pounds; receives an image at 5 miles with its built-in antenna, and at 15 miles with only a small "rabbit-ear" antenna.

The portable radio held by the model contains one tube, the converter, and otherwise only transistors. That is a transistor in the forceps the young lady in the illustration is holding. Owing to the fact that one tube is retained, reduction in battery size and weight, as compared with a standard portable radio, is only 66 percent.

Diverse Applications Cited

Other transistor devices unveiled included: a "walkie-lookie" or portable TV camera, a roving microphone, "wireless" record player, complete public address system, electrical ukelele, electrical piano, and electronic computing and adding equipment.

The "walkie-lookie" does not use all transistors, but uses 17 transistors plus a number of vacuum tubes. It therefore still retains much of its original size and weight. These are expected to be reduced still further by progressive substitution of transistors for tubes.

The roving microphone is a complete radio broadcasting unit (range 25 feet) about the size of a cigar. It contains two transistors, a battery, and a dynamic microphone.

Presages New Era in Sound

Using only one transistor, and a 1.35-volt battery, a similar arrangement "broadcasts" the sound of a record player for all of 24 inches distance: in other words, the record player is placed alongside or on top of a standard radio, and the radio will reproduce the record simply by tuning it to the transistor frequency.

A complete record player, portable, with built-in transistor amplifier, designed for the RCA 45-rpm discs, was also shown. It is powered by a 22½-volt battery which gives 75 hours of operation.

The public address system demonstrated had an output power of 1.4 watts through a 12-inch speaker. It also was driven by a 22½-volt battery, with operating life estimated at 25 to 50 hours.

Model holds portable radio receiver in which there is only one tube, all other tube functions being performed by transistors. Small size of transitors is indicated by the one in the forceps. Because there is still one tube in the circuitry, size and weight of the batteries used have been reduced only three-fold as compared with those needed for comparable all-tube receiver.

The toy "piano," operating on the principle of an electronic organ but with transistors instead of tubes, did not have a complete keyboard but only eight keys, serving, however, to demonstrate the general idea. The entire device is about the shape and size of eight piano keys. Two miniature 1.35-volt batteries operate it with an estimated service life for the batteries of 5,000 hours.

The electrical ukelele has a transistor amplifier, magnetic pickup, battery, and loudspeaker mounted within it; the speaker being located against the hole of the ukelele. Battery life is estimated at 10 hours.

A transistor counter capable of a million counting actions per second and a transistor adder performing up to 100,000 additions per second, were also demonstrated.

Influence in Many Fields

Among other items shown were an all-transistor portable radio (not the one pictured here, which still retains a single tube); an all-transistor portable FM radio; a partly-"transistorized" industrial or supervisory TV system; and a partly-"transistorized" home TV receiver with 17-inch viewing tube.

The portable, completely "transistorized" TV receiver shown in the accompanying illustration, fits into a case smaller than that of most portable type-

writers (approximately 1-foot x 1-foot x 6 inches). It weighs 27 pounds, contains 37 transistors, and has a power consumption of 14 watts.

The automobile receiver, illustrated herein in chassis form, is of the push-button type, ultizes 11 transistors, and delivers substantially standard automobile receiver volume. But it operates, as said, directly from the car battery, without the usual vibrator, power transformer and rectifier, and draws no more battery current than two dial lights.

None of this equipment is as yet on the market, and no announcement of when it will become commercially available has been made. RCA's Dr. E. W. Engstrom, vice-president in charge of the Laboratories Division, explains: "We

Tubeless automobile radio receiver in hands of RCA's D. D. Holmes operates directly from car battery without vibrator, transformer or rectifier, utilizes 11 transistors in place of tubes. It delivers normal car radio volume, imposes only one-tenth of normal drain on battery. Receiver has push-button tuning. Holmes holds one of the transistors. Note compactness of this tubeless chassis.

haven't yet worked out mass production techniques for transistors. . . . Thus, the cost of even those few types of transistors that are available in limited quantities is still high."

Dr. Engstrom, incidentally, does not expect transistors to replace tubes entirely. There will always be jobs tubes can do better, he believes, and he looks forward to mixed tube-and-transistor devices as well as to others using transistors only or tubes only.

According to Nathan D. Golden, Director of the Motion Picture and Photographic Products Division of the U. S. Department of Commerce, West Germany, including West Berlin, now has one movie seat for every 27 persons. Theatres number 4,547.

History of the American Labor Movement

Prepared by the United States Department of Labor for official use and reference, this history traces labor activity and legislation from Colonial times to today.

Chapter VI. The Labor Movement in 1950

AS IT exists today, organized labor in the United States is made up of more than 200 autonomous national and international unions. Most of these unions are affiliated with either the AFL or the CIO. A number of railroad and Government workers' unions, as well as a few others, have never become a part of a federated group. Several other unions have at various times belonged to either the AFL or CIO but have withdrawn or been expelled. All of these unaffiliated unions are commonly known as "independents."

As of September 1950, the Bureau of Labor Statistics had record of 208 national or international unions, of which 107 were affiliated with the AFL, and 30 with the CIO (after expulsion of all Communist-dominated unions), while 71 were independent. The number of local unions chartered by "parent" or national unions is estimated to be more than 70,000. Total membership of these unions is estimated to be between 14 and 16 million, including 675,000 Canadian members.

25% of Total Now Organized

In relation to the Nation's total labor force about one out of every four workers now belongs to a union. Union members, however, comprise more than 40% of that portion of the labor force in which unions have concentrated their organizing efforts. This portion excludes agricultural and domestic workers, the self-employed, and other smaller segments of the labor force which, at least until recently, were not susceptible to trade-union activities.

In addition to the locals which are chartered by their respective parent organizations, some local unions are directly affiliated with the AFL (federal labor unions) or with the CIO (local industrial unions). These directly affiliated locals are usually confined to trades and industries where no appropriate national union exists.

Chain of Command

Both the AFL and the CIO maintain city and State organizations with which their affiliated unions within the area are expected to join. At the beginning of 1950, the AFL had 50 State federations of labor, including Alaska and Puerto Rico, and 811 city centrals. The CIO reported 39 State industrial councils and 245 city and county councils.

Over-all policies of both the AFL and CIO are determined at the annual conventions by delegates elected to represent constituent unions. Between conventions, authority is vested in elected officers and an executive body selected from affiliated unions. Affiliation with either the AFL or CIO is formalized by both organizations through issuance of "charters" outlining the affiliated union's jurisdiction, that is, the craft or class of workers, or industries, from which a union may recruit members and represent workers in collective-bargaining negotiations.

Unions are frequently described as *craft* or *industrial* unions, depending upon whether they seek to organize only specified skilled groups or all workers in an industry irrespective of their skills. Few American unions, however, now fall clearly within either of these two types. Many unions are better described as *amalgamated* or *multicraft* because they include two or more skilled or semi-skilled groups. Other unions are better classified as *semi-industrial* because, although they may include all production workers within an industry, they frequently exclude certain maintenance, technical, or clerical groups.

Generally, most AFL unions tend toward the craft or multicraft type (e. g., the International Plate Printers, Die Stampers and Engravers' Union, and the Brotherhood of Painters, Decorators and Paperhangers); while most CIO unions are more readily classified as industrial or semi-industrial (e. g., the United Steelworkers, the United Automobile, Aircraft and Agricultural Implement Workers, and the Transport Workers Union).

AFL Departmental Setup

To coordinate the common interests of many crafts, the AFL has established four "departments," each composed of a group of international unions with common interests in certain industries. Thus, the Building and Construction Trades Department has 19 affiliated international unons; the Metal Trades Department, 14 unions; the Railway Employes' Department, 6 unions; and the Maritime Trades Department (established in 1946) 5 unions. Several unions are members of more than one of these departments.

Each of the AFL departments holds separate conventions, and functions through subordinate bodies organized on a local, State, district, or, in the case of

the railway shopcrafts, on a "system" basis.

Unlike other departments, the Union Label Trades Department, the fifth in the AFL, is composed of 56 affiliated unions maintaining union labels or insignia. This department is designed to encourage union organization and higher standards of workmanship through appeal to consumers to buy union-made goods or services.

Collecting Bargaining Process

No similar department exists in the CIO, although matters of common concern are frequently handled through its regular and special committees.

Collective bargaining is an orderly procedure whereby representatives of workers meet with representatives of employers to negotiate or "bargain" over the terms of a contract designed to govern their working relations. The results of the bargaining are set forth in a written agreement, signed by representatives of the union and the employer. This agreement specifies the terms of employment and conditions of work, provides guarantees against arbitrary discharge, and sets up machinery for cooperation in applying the terms and meeting the problems arising out of the agreement.

It is estimated that over 100,000 such agreements are currently in effect, and that at least 15 million workers are directly covered by them.

Agreements vary widely. Some are narrowly restricted to matters of wages, hours, and working conditions. Others provide for the joint administration of health, welfare, and pension plans; job evaluation and merit rating schemes; production bonus arrangements; and joint efforts to increase production and decrease costs.

[TO BE CONTINUED]

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN TV STUDIO AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES. THIS 16-mm DEPARTMENT OF IP WILL APPEAR MONTHLY.

Outline of 16-mm Projections

Presenting some comments on the history and operation of 16-mm projectors, abstracted from a very complete text-book on the subject.*

AS THE TECHNOLOGY of the motion picture advanced from its enthusiastic yet humble beginnings, it was only natural to expect manufacturers of films and equipment to attempt to reduce costs to the point where films would be practicable for amateur and personal movies—enlarging the scope of motion pictures tremendously. One of the early steps taken to satisfy that desire was the manufacture of smaller film, arbitrarily selected at 16 millimeters.

It was not until 1924, however, that the big step in making films really suitable for the amateur was made when the Eastman Kodak Company introduced reversal film on the 16-mm market. Prior to that time, all motion pictures—whether 35-mm or 16-mm—required two strips of raw film to produce the single strip used in the projector. When developed, the exposed original film provided a negative image that was dark in the bright portions of the scene and light in the dark portions. In order to obtain a positive image suitable for projection, a copy had to be made on a second strip of film, with the bright portions of the scene light and the dark portions dark. The process is quite similar to that used for film from simple still cameras.

Reversal Film

Obviously, if the original film could be developed directly into a positive image suitable for projection, the amount of raw film required would be cut in half, and the printing and the second developing operations eliminated. Reversal film processing accomplishes just this, and is today used almost exclusively for black-and-white original film of 16-mm and all lesser widths. This type of film is still unknown as an original in the 35-mm width; all such original film is negative—just as it was some fifty years ago when motion pictures were born.

Common Film Sizes

As time passed, attempts were made to broaden the market by reducing the cost of amateur motion pictures till further. In the United States, 8-mm film provided the answer; it was first introduced by Eastman Kodak in about 1934. Further, 17.5-mm, made by splitting 35-mm in two, found a few specialized uses; original sound recording for Hollywood films was one example.

In France, 9.5-mm film had been introduced somewhat earlier, for educational as well as amateur purposes, and proved a strong competitor of 16-mm in popularity. Later, 9.5-mm equipment and films were imported into England, but have become of lesser importance since the early part of World War II. Since 9.5-mm did not make headway in the United States, it is unlikely that it will become a major factor now.

Only 35-mm, 16-mm, and 8-mm need be given serious consideration for the future, since any other possible film width subsequently proposed for standardization will need a very strong case for adoption before it can be seriously considered.

Films larger than 35-mm were run in theatres for a limited period about 1930; among the better known were the 62-mm (RKO Spoor-Berggren), 65-mm (Paramount-LaPort), and 70-mm (Fox-Grandeur). None of these widths was standardized, and since 1933 none has been used commercially to any extent. It is interesting to note that these larger sizes had different aspect ratios, since a wider picture in comparison with picture height was considered desirable.

16-mm Sound-Recording

When sound was introduced commercially into films in 1928 and 1929,

*Cond. from "16-mm Sound Motion Pictures," by W. H. Offenhauster, Jr., published by Interscience Publishers, Inc., New York.

it regenerated the motion picture industry and caused very rapid expansion and technical growth. At that time, sound recording equipment was used almost exclusively for 35-mm film, in view of unsuccessful earlier attempts at commercial recording directly on 16-mm film. Within a few years, 16-mm sound prints were being made commercially by optical reduction from 35-mm negatives (a picture negative for the picture original, and a sound negative for the sound original), and commercial entertainment pictures thus became available in the 16-mm film with.

One of the earliest 16-mm sound projectors was designed by R. P. May of RCA in 1930. It was compact, light, and gave surprisingly good performance in comparison with the 35-mm portable sound projectors marketed at the time. Almost a decade passed before the performance of this machine was surpassed.

With the availability of such films and projectors in the 16-mm size, amateur and other non-theatrical film users began to think in terms of sound films rather than silent films, and a potential demand was created for 16-mm sound recording equipment.

Sound Quality Improved

During the period from 1932 to 1936, 16-mm sound-recording equipment was marketed, but the quantity was small, and its usefulness handicapped by poor quality of the projected pictures and sound, which did not compare at all favorably with the quality of pictures seen at local theatres.

During this same period, the edge had worn off the novelty of sound in the 35-mm entertainment motion picture theatre, and serious efforts were made to improve the technical quality of both image and sound. It was then that "wide range" and "high fidelity" became by-words for sound, and improvement was seen in all phases of recording and reproduction. By the end of 1936 there was a fair degree of consistency in the technical quality of entertainment films shown in 35-mm movie houses.

From 1936 onward there was a period of further improvement in 35-mm films, and of both improvement and rapid growth in 16-mm films. When new developments in films or apparatus occurred in 35-mm film technique, it was not long before the same were adapted (where suitable) to 16-mm films and vice versa—each size exerting a strong technical influence upon the other.

16-mm Color

The presence of Kodachrome for motion pictures in the 16-film width and its equally notable absence in the 35-mm film width provided further impetus to an already interested and active industrial and educational motion picture market. This market began to demand color duplicates—*with sound.*

Kodachrome made it possible to "shoot" in color and make a small number of copies at very low cost (when compared with available 35-mm methods, such as Technicolor). No special camera was needed, no special camera crew, and no long contract negotiations were required to obtain a desired color film. It was necessary merely to use Kodachrome in a good 16-mm camera to obtain the picture, with sound recorded in much the usual manner. The technological millenium of color and sound in educational films as envisioned by Edison had become a reality within but 50 years of the birth of the motion picture itself.

World War I had seen the use of motion pictures to some degree by every large nation of the world. The amount of 35-mm film used for record purposes ran into millions of feet. The United States Army had prepared 52 reels of a series called "Training of the Soldier" and about 13 reels called "Elements of the Automobile." The Germans had their films too; it was remarked by one German general that in modern warfare the nation with the most complete photographic intelligence would be the likely victor. Even at that early time films were made for propaganda purposes (Germany and Russia) as well as for training.

When World War II arrived, the motion picture, in principle, had been accepted as a training tool, although the amount of material available was quite limited. The United States Army, Navy, and Air Forces had chosen 16-mm as the width best suited to their needs. Since there was a large quantity of 35-mm production equipment available such as cameras, sound recorders, editing equipment, etc., and a relatively large pool of personnel trained to handle this equipment, it was logical to assign to 35-mm the major part of the production burden. The 16-mm projection prints were obtained from the 35-mm films through optical reduction from special picture and sound duplicates copied from the edited negatives.

The volume of 16-mm prints made for training and similar purposes in World War II was measured in millions of feet *per day*. Such wide use resulted in even greater and more insistent demands for better technical quality in the projected films. In order to meet these demands, much technological improvement was needed in every stage of the process. As each improvement was made, it was crystalized into an American War Standard wherever possible. Standardization is being continued as a normal peacetime activity, and its accumulated effects cannot help but be felt throughout the world in the form of more and better films for more people—and at a lower cost.

[TO BE CONTINUED]

OBITUARIES

Earl R. Frank, 63, member of Local 228, Toledo, Ohio, died January 5 after a brief illness. He joined Local 386, Columbus, Ohio on September 9, 1915, and two years later transferred to the Toledo Local. Earl Frank was Toledo's first commercial radio station owner, operating a 10-watt broadcasting station back in 1921 under the letters WTAL. He later sold WTAL and confined his efforts to motion picture projection.

Joseph Canick, member of Chicago Local 110, died recently at the age of 61. Until the time of his death he worked in the projection room of the Palace Theatre.

Charles Andrews, 67, member of Toronto Local 173, succumbed to a heart attack on January 7 last while trying to move his car from the parking lot back of the Eglinton Theatre, where he worked as projectionist. Andrews was born in Orangeville, Ont., and was a member of the Toronto Local for the past 32 years. He served on the Local's sick committee, was a member of the American Projection Society, and of the Queen City Masonic Order.

Arthur Barber, 65, member of Toronto Local 173 for the past 35 years, died suddenly at his home on January 16. He was a veteran of World War I, and was a member of the Famous Players 25-Year Club.

John A. Granquist, 54, member of Local 286, Des Moines, Iowa, was stricken with a fatal heart attack on January 16. Granquist was secretary of the Local for a number of years and for the past ten years served on the executive board and on the board of trustees. He worked in the projection room of the RKO Orpheum Theatre in Des Moines. One of his brothers, Clarence, is also a member of Local 286.

Murray C. Trefry, veteran member of Local 680, Halifax, N. S., died early last month. Trefrey was one of the pioneer motion picture projectionists in Nova Scotia.

THREE-D PROJECTION: PROGRESS REPORT

(*Continued from page* 10)

lever. Frame only one machine, using the other projector as the pilot.

'Convergence' and its Import

It is believed that in the near future all 3D will be photographed using "convergence", which means simply that somewhere in each scene both pictures will be superimposed, appearing as one. Photographically, convergence is rather simple. It is controlled by the interocular separation of the camera lenses.

For example: a long shot would be photographed with a camera lens separation of up to 4 inches. As we move in for medium shots and/or closeups, our camera lenses are brought closer together. Closeups will be photographed with these lenses as close as 1½ inch. This is done to control the over or under emphasis on depth.

In a very short time we should take this procedure in stride much the same as we do now when focusing a projector. We recognize diffusion and effects now and they help us keep our pictures sharp on the screen. By the same token, we will recognize "convergence" and therefore have a tool to help us check our picture placement while the show is on.

While we're talking of the picture, let's say a word about focusing a 2-film, 3D picture. Naturally, both pictures must be focused individually. This can be accomplished by closing one eye at a time and focusing one picture at a time. If we have trouble closing one eye at a time, we can make a tool that will simplify the whole procedure. Take two pair of Polaroid glasses and (using grease pencil), mark X's on the left glasses and O's on the right glasses. Trade an X and an O. You will then have two X's (left) in one pair of spectacles and two O's (right) in the other. Place them by their respective projectors and use them *only* for focusing. You will only see one picture with each pair of glasses.

Accessory Equipment

F. Reels Magazines, Rewinds: Using two projectors simultaneously forces us to change our procedure with respect to putting on the show. Changeovers are eliminated unless we have four projectors. As stated in IP last

Features

Western Series

Travelogues

News

BLACK
and WHITE

COLOR

and also CINERAMA *

They all look best with

SUPER SNAPLITE

f/1.9 Projection Lenses

True speed of f/1.9 in every
focal length up to
7 inches. Ask for Bulletins 207 and 209.

*CINERAMA uses Kollmorgen Super Snaplite Lenses

YOU GET MORE LIGHT WITH SUPER SNAPLITE

KOLLMORGEN Optical CORPORATION

Plant:
Northampton, Massachusetts

New York Office: 30 Church Street, New York 7, N. Y.

month, the showings today are presented in 55-minute segments with intermissions. Utilized are 5000-foot, 23-inch reels and 24-inch magazines. In some theatres with an exceptional projection angle, wedges have been used to tilt the upper magazines away from the front wall and the lower magazines from the bases. In cases where dimmer controls, conduits, *etc.*, interfere, this is not possible. The only alternative is to move the projectors back (with attendant modifications—masking, ports, *etc.*) or go to a smaller reel.

Use of a 20-inch reel in a 21-inch magazine has been suggested; also a 17½-inch reel in a 19" magazine; also a 16½-inch reel which can be used in most present 18-inch magazines. (The 18" magazines with the fire trap mounted inside the case will not take this reel.) The frequency of intermissions will be increased with the smaller reels. Even though the 55-minute intermission intervals seem to be welcome, there are grave doubts in most quarters as to the advisability of decreasing those intervals.

Thickness of film stock is also an item. Black-and-white will vary from 0.0058 inch in thickness to 0.0060 inch. Color from 0.0062 inch to 0.0068 inch. Some 2780 feet of black-and-white can be mounted on a 16½-inch reel as against 2420 feet of Ansco Color. If all this would tend to indicate that confusion exists in the release plans of the majors, it would indicate correctly. For the first few pictures we will probably receive them in a hodge-podge of lengths. We hope for a standard release length in the very near future.

Takeup Trouble Licked

Takeup trouble was experienced in the first few screenings with the 5000-foot reels. Replacement of the friction type with the X-L type takeup has eliminated this problem. Rewinds will have to be modified: 5000-foot electrics are available and hand rewinds can be modified by blocking up.

This brings us up to date as of February 1 this year. Time and date are specified because changes will undoubtedly take place within the next 24 hours. The writer is looking forward to bringing those changes to your attention next month.

[TO BE CONTINUED]

Kodak Achieves f/0.75 Lens

Eastman Kodak Company announces that it has completed design of an f/0.75 cine lens. This is eight times as fast as the f/2.0 lenses commonly used in motion picture projection. It is intended for taking motion pictures of fluorescent screens, as in television picture tubes; and gives "acceptable definition" of a 12-inch diameter object on a standard silent 35-mm motion picture frame. Focal length is 110-mm; price about $3,000.

Westrex Executive Changes: Warn, Allinsmith Named V-P's

H. B. Allinsmith, formerly managing director of Western Electric Company, Ltd., London, has been elected a director and vice-president of Westrex Corp., New York, effective on March 1. He will take over the duties of D. C. Collins, vice-president, who will retire on February 28.

R. E. Warn, manager of Westrex Corp.'s Hollywood Division, has been elected a vice-president of Westrex, effective March 1. He is also president of Sound Services, Inc., Hollywood.

Film-Weld
TRADE MARK
Successor to Film Cement

• The NEW, improved, positive method of permanently patching all types and makes of film—8mm., 16mm., 35mm., Trucolor, Technicolor, Kodachrome, Nitrate and Safety Film.

Used and endorsed by Projectionists in countless theaters.

specifically for *lasting* Patches.

ESSANNAY ELECTRIC MANUFACTURING CO.
1438 North Clark Street Chicago 10, Illinois

*More than 6,000 pages of technical data on all booth and sound equipment, theatre TV, and multi-projector, multi-image, three dimension, multi-sound techniques. A warehouse of knowledge carried by every Altec Service Man.

6,000 REASONS* WHY ALTEC GIVES BETTER SERVICE

SERVICE CAN'T BE JUDGED ON COST ALONE. Cheap service can be expensive through unnecessary replacements and failures caused by lack of knowledge. Every Altec Service Man is kept up-to-date on the best method for servicing every piece of booth and sound equipment. His know-how and the technical assistance at his fingertips are your most economical operating insurance. For trouble-free operation have Altec install, service and repair your booth and sound equipment.

ALTEC SERVICE CORPORATION
161 Sixth Ave., New York 13, N. Y.
The finest technical service for theatres

THE OPERATORS' FAVORITE!
GoldE's Automatic Enclosed Rewind Always Works! Silent, safe, U.L. approved! Eliminates fire hazard. Positive friction . . . can't clinch film. Tilt-back case . . . reels can't fly off. Microswitch safety cut-off . . . when door opens or film breaks, motor stops!
AT OTHER THEATRE SUPPLY DEALERS
MANUFACTURING COMPANY
DEPT. IP. 4888 N. CLARK ST. • CHICAGO 40, ILL.

THEATRE SOUND REPRODUCERS

(*Continued from page* 18)

not be flame-polished because diamond, being a form of carbon, burns.

Specific Type Needle Required

Osmium-iridium and other "high atomic-weight" metal-point needles, although costing less than half the price of a good sapphire stylus, do not last nearly so long. Moreover, metal stylus points readily develop rough spots and scratches which exert a scouring action upon the record grooves.

Whatever the point may be made of, the correct size of needle should be used for the different types of records —standard 78 RPM, "Long-Playing 33-1/ RPM, and 45 RPM. *The grooves of these three types are differently dimensioned.* Many of the newer crystal pickups have turret needle holders which enable the right needle to be brought into playing position by a flick of the finger.

Most theatres employ standard 78 RPM disk records for music because a wider variety of musical selections is available on them. In fact, the number of 78's manufactured is greater than that of all other speeds combined, and it is expected that this state of affairs will continue for several more years. The newer speeds have several important advantages; but well-made plastic 78's are still tops for sound quality, in the opinion of experts.

Sapphire Points Recommended

The needles that give the best results with the conventional crystal-type pickup for standard-groove, lateral-cut disks are sapphire-point needles having a bent shank. The offset construction is vital to better weight-distribution of the tone-arm, and it also eliminates needle-chatter and much of the surface noise. The shape and thickness of the shank are designed to reduce response "peaks" which would result in unnaturally shrill sound. These needles are rated at 10,000 plays — which means that they are good for about 500 plays before the critical listener can detect distortion due to a worn needle. In sound-systems having filter circuits which cut off disk-reproducer response below 4,000 cps, the "10,000-play" needle is good for at least 1,000 to 2,000 plays.

If the standard crystal cartridge used is of the type furnished with both a

One source
FOR ALL YOUR
DRIVE-IN NEEDS!

NATIONAL
THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc

The answer is simple, — DEPENDABILITY . . . A reputation for "know-how" in every facet of drive-in planning and equipment . . . immediate SERVICE from 29 branches, coast-to-coast, with a finger on the pulse of every new drive-in development! That's why more and more exhibitors come to depend on NATIONAL . . . and you'll be wise to contact NATIONAL for all your drive-in needs!

• PLANNING!
From A to Z — Covers Everything — ENGINEERING — BLUEPRINTS — KNOW-HOW!

• EQUIPMENT!
Place your confidence in NATIONAL Equipment — SELECTED — PROVEN — GUARANTEED!

• FINANCING!
NATIONAL has a sensible, convenient payment plan — pay out of income!

Are you building a drive-in? Contact your nearest NATIONAL Branch or write NATIONAL THEATRE SUPPLY, 92 GOLD STREET, NEW YORK 38, N. Y.

set-screw and an optional thumbscrew (the latter intended for use when ordinary needles requiring frequent changing are employed), needle-scratch and shrill soprano tones may be further reduced by using the long thumbscrew to hold the 10,000-play (?) sapphire stylus in the cartridge. The thumbscrew, being heavier than the short set-screw, has sufficient mass to provide a desirable mechanical impedance.

Sound-on-disk, like sound-on-film, may suffer from flutter, gargle, etc. A piano recording is useful for detecting traces of wows and flutter in the revolving turntable. Gargle reveals itself mostly in the tenor, alto, and soprano regions of the sound spectrum. "Whiskers," caused by extremely rapid variations in turntable speed (often caused by vibration transmitted from a loosely mounted motor), does not affect the bass and tenor notes at all, but makes the higher treble tones, such as those of the violin, sound raspy.

Most of these defects can be corrected by overhauling, cleaning, and adjusting the motor and turntable assembly. The projectionist should not expect satisfactory disk reproduction if the motor and its reduction gears are worn, if the assembly is loose or improperly mounted on the motor-board, or if the pickup is so mounted that it does not track the record-grooves tangentially.

Correct Turntable Speed

Correct turntable speed is a mighty important matter. While a discrepancy of 2 or 3 revolutions per minute in 78 RPM turntables will not noticeably harm the quality of the recorded music, it is better to have the speed exact. Turntable speed can be checked by a projecting slip of paper placed under a record on the turntable Using a pocket-watch having a second-hand for timing, count the number of times the slip of paper brushes against one hand placed close to the turntable during a one-minute period. Stroboscope disks accurate to a few revolutions per minute may also be used.

Badly worn records should not be played in the theatre because they make a poor impression upon the audience. If patrons get the idea that the theatre is so poorly managed that new records of good quality cannot be afforded, won't they begin at once to look for other symptons of cheapness? While it is entirely possible that they will find what they look for, no profitable purpose is served by offering them an open invitation to do so.

[TO BE CONTINUED]

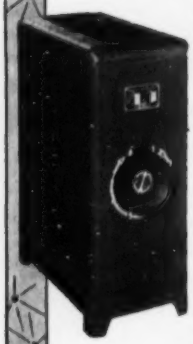
Preserving Our History

England, France, Italy, Denmark, Belgium, Czechoslovakia and Switzerland are now collecting and preserving pioneer and historical motion picture films, according to *Image*, the Journal of Photography of the George Eastman House; while in the U. S. the George Eastman House, the Museum of Modern Art, and the Henry Strong Collection of Historical Motion Pictures are engaged in the same activity. Letters and documents, in addition to original negatives and surviving prints, are also being preserved. And still a great deal of irreplaceable material dealing with the childhood of the industry is being irretrievably lost, *Image* laments.

Psychological Films Catalogue

Motion picture films that deal with psychological subjects and mental health have been catalogued by the U. S. Health Staff Institute. The catalogue does not include all such films available, but only those that have been reviewed and approved by at least three or more members of the Institute staff. A copy can be obtained for 30 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

WHY Strong RECTIFIERS ARE PREFERRED



The only rectifiers especially designed, manufactured and tested in one plant together with and for use with motion picture projection arc lamps. This is highly important, as efficient operation of each type and rating of arc necessitates a rectifier specifically engineered to its particular requirements.

There is a dependable Strong Rectifier for every type projection lamp:

2-Tube - 4-Tube - 6-Tube Single and Three Phase Models for

- Rotating Feed Angular Trim High Intensity
- Copper Coated Coaxial High Intensity
- 1 K.W. High Intensity
- Low Intensity

All assure smooth output current, long life, low operating temperature, and flexibility in control.

Write for Free Literature

THE STRONG ELECTRIC CORP.

City Park Ave. • Toledo 2, Ohio

PROJECTION LAMPS • SLIDE PROJECTORS
SPOTLIGHTS • RECTIFIERS • REFLECTORS

SAVE ON CARBONS! INCREASE LIGHT!

MADE FOR MOST ALL MAKES OF LAMPS

Get Lower Cost 3-D With

HUFF'S HYDRO CARBON COOLERS

Get 6000 to 7000 feet of film from one trim of carbon. In most cases this can be accomplished with your present equipment. Use 9-mm black and 8-mm negative carbons.

A slow rate of carbon burning is obtained with the HUFF HYDRO CARBON COOLER.

LESS AMPERAGE • SIMPLE INSTALLATION
COOLER OPERATION • SAVE ON PARTS

See Your Dealer or write for new folder direct to . . .

HAL I. HUFF MFG. CO., 659 W. Jefferson Blvd., Los Angeles 7, Calif.

SPLICES NOT HOLDING?

Film breaks are costly. Play safe by using

JEFRONA

All-purpose CEMENT

Has greater adhesive qualities. Don't take our word for it. Send for FREE sample and judge for yourself.

CAMERA EQUIPMENT CO.

1600 Broadway New York 19, N. Y.

Strong Electric Announces New 3-D *Projection Lighting Equipment*

By ARTHUR HATCH, Engineering Vice-President, Strong Electric Corp.

THE sudden and intense interest of exhibitors in 3-D pictures has resulted in a rush to convert projection equipment for this type of presentation. In many instances, the exhibitor has not realized the limitations of his projection lamps and arc power supply sets because his main interest has been drawn to the unusual necessities of most of the new 3-D systems —coupling of the projectors, Polaroid filters and glasses, and non-diffusing screens—to say nothing of the actual booking of such 3-D features.

Most of the many systems of third-dimension picture projection call for simultaneous operation of two or more projectors and projection arclamps.

In these systems, since both projectors run simultaneously, the conventional changeover is impossible unless four or more projectors are used. To make this duplication of equipment unnecessary, reel sizes have been increased to accommodate up to 5,000 feet, so that ordinarily only one intermission is necessary during the average feature.

Increased Burning Time

This increase in reel size demands lamphouses with a burning time of at least 58 minutes without retrimming to permit the 50-minute running time, the 2-minute burning-in time, and a 10% safety factor. Most projection arclamps in use now were designed to project only two double reels without retrimming, and they cannot be used for 3-D presentations without 2 or 3 intermissions during a feature—a highly undesirable condition.

The second consideration with regard to projection lamps is not as obvious as the first. It concerns the increase in illumination from the lamphouse, which is necessary to overcome the losses introduced by the filter at the projector and the glasses worn by the viewer.

Although both projectors operate simultaneously and the projected pictures are superimposed, one over the other on the screen, only one picture is seen by each eye. Hence, since the visual sensation of brightness as sensed by one eye is not additive to that sensed by the other eye, the brightness value from both projected images is only equal to the brightness of *one* image.

Screen Brightness Way Down

Moreover, the light from these projectors has been reduced to approximately 50% by the filter at the projector before it hits the screen. It is true that the non-diffusing type of screen does somewhat increase the apparent brightness to the viewer, but the net effect is offset by the approximately 15% loss in the glasses worn by the viewer, and the general trend toward a larger screen size for 3-D to overcome the size-reduction illusion.

As a rule of thumb, the net brightness to the viewer for 3-D projection will be approximately 40% of the brightness formerly obtained on two-dimension pictures with the same projection lamp light delivery.

Strong Electric Corp. in announcing its new projection arc lamp catalog 90,000-8 (3-D) at this early date, has again demonstrated its policy of keeping abreast of new developments and of being able to furnish equipment for any projection lighting need.

The new Strong 90,000-8 (3-D) projection arclamp, designed especially *for* the requirements of 3-D projection, accommodates a 20-inch trim of carbons which will burn continuously for a full hour at 78 amperes (using 9-mm positive and 5/16" negative) or at 95 amperes (using 10-mm positive and 11/32" negative).

Automatic Crater Positioning

The position of the positive arc crater in the Strong 90,000-8 (3-D) is automatically maintained at the exact focal point of the reflector by means of the exclusive Lightronic crater positioning system. The positive and negative carbons are advanced by separate motors, the speeds of which are governed by the Bi-metal Lightronic Tube. Once the arc has been struck, the crater positioning and the gap length are automatically maintained without manual adjustment.

This feature is important in 3-D projection because with the long-burning period it is virtually impossible to maintain the position of the crater exactly at the focal point of the reflector without frequent manual corrections, unless an automatic positioning system is built into the lamphouse.

The Optical System

The optical system comprises an elliptical reflector 16½-inch in diameter with a resultant speed of F:1.9 to match the currently available high-speed F:1.9 projection lens. The mirror and its tilting mechanism are an integral part of the back door of the lamphouse, which swings out to allow easy cleaning of the reflector and convenient trimming of the lamp.

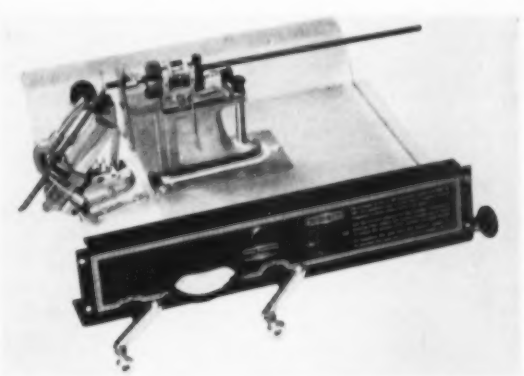
The Strong 90,000-8 (3-D) features unit construction whereby the various components are instantly removable for cleaning and inspection. The lamphouse is finished in attractive gray wrinkle with chrome trim and weighs 165 pounds. There is an arc imager, an ammeter for reading the current at the arc, an automatic trimming and framing light, and an inside dowser system.

A rectifier or generator burn-out will be the first indication to many exhibitors that they have overlooked a very important factor in converting to 3-D pictures.

Power Supply Requisites

Almost without exception, present rectifiers in use for 35-mm projection arc supplies are designed to withstand operation for 20-minute "on," 20-minute "off" cycles only. The intermittent "off" cooling period is necessary to avoid temperatures within the equipment which will damage and break down the electrical insulation, and result in a burn-out.

Generators likewise are designed for use under the present projection practice of dual operation only for a 3- to 5-minute period each 20 minutes. Operation of two lamps from one generator for lengthy and repeated periods will cause overheating



TWO VITAL UNITS IN STRONG ELECTRIC CORP. 3-D LIGHTING EQUIPMENT

Left: The 95,008 (3-D) rectifier. Right: The burner mechanism of the 90,000-8 (3-D) H. I. arclamp. Strong Elec. Corp. meets the 3-D challenge.

of this type of equipment, and consequent burn-out.

Many exhibitors will learn, to their sorrow, that although their present arc power supply equipment will deliver the required power for the extended periods as required, the cumulative effects of the resultant overheating will result in failure.

Furthermore, this failure may not occur in days or weeks, but perhaps in several months. Failures of this type will certainly not be covered by any manufacturer's guarantee, and the exhibitor will have to bear the cost of repairs or new equipment, plus the loss of a few showings inasmuch as there is no chance of limping along on one projector with 3-D systems.

New Heavy-Duty Rectifier

Strong again moves to the fore with the announcement of a continuous-duty rectifier, catalog 95008 (3-D), companion to the 90,000-8 (3-D) lamp for 3-D projection arc supply.

This new rectifier will meet the requirements for 3-D projection under continuous-duty cycles for current ranges of 75-85 amperes when using a 9-mm bare positive carbon in an agle trim lamp. Transformer taps provide adjustment to compensate for supply voltage variations through a range of 10% above or 10% below the rated A.C. input voltage throughout the output rating range.

The complete electrical and mechanical assembly consists of three transformers, six tube sockets and manually-operated output control handle which actuates the 8-point rotary switches that are employed to increase or decrease the output power even when the arc is burning.

High-Power Rectifiers

Higher-power 3-D rectifiers for use with lamps burning 10-mm carbons are also in production and will be available for early delivery by Strong.

Strong Electric Corp. also announces the establishment of a special department to handle the problems of exhibitors and equipment-supply dealers in connection with 3-D lighting and power problems. They will be glad to assist to the extent of their specialization in their field if a problem is outlined for them.

End of 16-mm Film Listings

The series of listings under the title "Local Sources of 16-mm Films" which have been appearing in recent issues of IP has been terminated effective with the last (January 1953) issue. These data, arranged alphabetically by states and cities, are available in a much more compact and handy from in Bulletin 1951, No. 11 ("A Directory of 2002 16-mm Film Libraries") through the Federal Security Agency, Office of Education. Address the Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D. C. The price is 30 cents.

Golden Heads Merged NPA Divisions

Consolidation of two industry divisions—Motion Picture and Photographic Products, and Scientific and Technical Equipment—was announced today by the NPA, U. S. Department of Commerce. Nat Golden, who has handled the film division since its inception in 1951, will direct the combined division.

Protect the HEART of your theatre...
1928 25 1953
YEARS OF PROMPT, EFFICIENT, COURTEOUS SERVICE
and you protect your box office
RCA
RCA Service Company, Inc.
A Radio Corporation of America Subsidiary
Camden, N. J.

CLAYTON BALL-BEARING
EVEN TENSION TAKE-UPS
For all projectors and sound equipments
All take-ups wind film on 2, 4 and 5 inch hub reels.
Silent Chain Drives
THE CLAYTON REWINDER
For perfect rewinding on 2000-foot reels.
CLAYTON PRODUCTS CO.
31-45 Tibbett Avenue New York 63, N. Y.

WHEN YOU SAY RAYTONE
you're right!
PANTEX ALL-VINYL SCREENS
DEPENDABILITY is our trade mark—ask our customers. They'll tell you. Contact your equipment supply dealer or write for information.
DRIVE-IN SCREEN PAINT
VINYL COATED SCREENS
PROJECTION OPTICS LENSES
The New "TRANSCENIC" SCREEN SURROUND
RAYTONE SCREEN CORP. 165 CLERMONT AVE. BROOKLYN 5, N. Y.

IP SERVICE BUREAU:
101. Ansco Color Film

(*Continued from page* 19)

camera printing apparatus, but also, in large measure on the skill of the operator.

The focus of the optical-printer lens is extremely critical; and exposure requirements are somewhat different from those obtaining in contact printing because the specular densities (of separation— positive emulsions) are generally 25% to 35% higher than the diffuse densities, resulting in a higher contrast-factor ("gamma").

Color-Balance Factors

Faulty color-balance in Ansco Color and similar color films is nearly always due to faulty processing and printing. Color control is vitally important, an instrument to be wielded only by an expert hand and a sympathetic mind. True, the emotional element is largely absent from non-dramatic films; but a first-rate color man would not have passed on to you films grossly unbalanced in color tone. No matter how bad the photography may have been, he would have remedied the defect. He knows how to do it.

Monopack color films such as Ektachrome and Ansco Color are entirely capable of providing excellent rendition of the full scale of color throughout a wide range of hue saturation and brightness. Ansco Color is noteworthy for its very wide latitude—capturing detail in deep shadows and highlights alike—and for its ability to reproduce with fidelity the yellow-greens and non-spectral purples and magentas, the most difficult of all colors to photograph.

I cannot overemphasize the importance of color control during the processing and printing of color films. Needless to say, the varying degrees of exposure inevitable in camera negatives filmed under varying conditions of illumination require control measures for regulating density as well as for color compensation. Control is critical in all color work, but not more so for Ansco Color.

Two Wide-Latitude Negatives

There are at present two low-contrast, wide latitude Ansco Color negative materials available. These are the Type 843 daylight-balanced 35-mm film and the Type 844 tungsten-balanced 35-mm film. The 16-mm negative films corresponding to these are the Types 243 and 244. Filters are available for use when shooting under lighting conditions that differ markedly from the color-temperature norms established for the two negative emulsions.

Color-balance difficulties may be experienced when making black-and-white separation positives from color negatives, or when making color dupe negatives from the separation positives, if it happens that the spectral characteristics of the red, green, and indigo filters employed are at variance with the spectral characteristics of the color films.

In the interest of best definition, neither glass nor gelatine filters should be placed in the image-forming beam, that is, they should not be interposed between the film in the projector of an optical printer and the film in the camera.

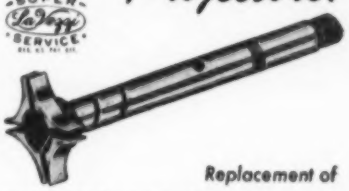
The sensitivity peaks of Ansco Color films are approximately 675, 550, and 450 millimicrons for red, green, and indigo, respectively. The absorption "peaks" (or, rather, "dips") for the Ansco Color cyan, magenta, and yellow dyes are, respectively, 670, 540, and 440 millimicrons. A comparison of these figures with the trichromatic data for the "standard observer," given in all editions of *The Handbook of Chemistry and Physics* (Chemical Rubber Publishing Co., Cleveland, Ohio), will supply ample evidence that the characteristics of Ansco Color make for high-fidelity color photography and reproduction.

Color-Balance Adjustment

Color balance may be adjusted during the printing of projection positives by using tinted filters for scene-to-scene corrections. Regular "travelling-matte" printers make possible the correction of

Don't Neglect Your Projectors!

SUPER LaVezzi SERVICE



Replacement of worn parts in your projector is the smallest item of good theatre maintenance

—and yet the most vital to patron satisfaction.

HAVE YOUR PROJECTION EQUIPMENT INSPECTED REGULARLY!

LAVEZZI MACHINE WORKS
4635 West Lake Street
Chicago 44, Illinois

Available At All Theatre Supply Dealers

Make Your Next Film Cement Order

ETHYLOID

You'll Be Glad You Did!

★

THE ONLY UNION MADE FILM CEMENT

FISHER MANUFACTURING CO.
1 Salter Pl. Rochester 13, N. Y.

WENZEL PROJECTOR CO.
Manufacturers of Many Types of
FILM REWINDERS

8 M/M
16 M/M
35 M/M
Film

Write for Illustrated Brochure

Pro-50 Projector Head

WENZEL PROJECTOR CO.
2505-19 S. State St. Chicago 16, Ill.

both density and color-balance simultaneously. This was described in my article on Ansco. There are also special color-film printers employing a red-green-indigo trichromatic illuminant, the relative intensity of the three primary components being adjustable.

Color rendition can be very seriously harmed by carelessness in developing Ansco Color film. The chemicals used should be those specified by the manufacturer of the film. All solutions should be fresh and of the proper concentration. And in the case of Ansco Color processing, the color developer should be kept within ½°F of the specified operating temperature, which is normally 68°F (20°C). The other solutions should be kept to within 2°F of the developer temperature. Formulas for the various solutions are obtainable from Ansco, Binghamton, N. Y.

Film Storage Requisites

Ansco Color raw-stock should be stored at temperatures not exceeding 70°F, the optimum range being 40° to 50°F. The relative humidity of the storage vault should come within the optimum range 35% to 45%. The taped raw-stock container should be placed at loading-room conditions at least 2 hours before opening. This precaution prevents moisture from condensing on the film.

During the interval between exposure and processing, the film should be stored under these same conditions. If the interval before processing is longer than 48 hours, the exposed film should be kept at a temperature of 35°F or less to stabilize the latent image.

Where tropical conditions prevail, exposed film should be immediately dessicated and placed in a sealed, dessicated container for prompt shipment to the processing laboratory. The sealed container should be kept under refrigeration if the interval before processing is extended beyond 48 hours.

The temperature and humidity conditions recommended for the Ansco Color raw-stock are favorable for the storage of the processed Ansco Color film.

Close adherence to these recommendations insures against any deterioration of color values, latent or otherwise, which might be induced by local conditions. These requirements are not unusual: they correspond with those recommended in the paper "Air Conditioning in Storing and Handling Motion Picture Film" by J. M. Calhoun (Eastman Kodak Co.) for the storage of ordinary black-and-white safety film.

I suggest that you catch the M-G-M Ansco Color production "Vaquero" when it comes your way. It will show Ansco Color at its professional best—and also give you an idea of how your Ansco Color training films *ought* to look. Because there is no possibility for poor image-definition to arise in Ansco Color film, as far as the film itself is concerned, and because poor color-balance means improper printing and processing procedures, I am forced to conclude that inexpert laboratory work lies at the bottom of your troubles with Ansco Color.

REEL-END ALARMS
Jackson's Patd. Automatic!
Can't Scratch Film! Foolproof! Lasts a Lifetime! $18.50 per pair On Money Back Guarantee
Order one at all Dealers or write to
AMERICAN THEATRE SUPPLY CO., INC.
2300 - 1st AVE. AT BELL, SEATTLE 1, WASH.

MONTHLY CHAT

(Continued from page 5)

facturer has been asked to make such a lens or has made plans on its own for so doing.

How much reflected light does 20th-Fox expect to get with Cinemascope projection? One of our scouts who viewed the process in Hollywood reports that the invited audience sat in total darkness for ten minutes immediately preceding the showing, but a check made during the running showed a reflected light level of 6 ft.-lamberts. This compares with the present standard of 15 ft.-lamberts.

Of course, 20th-Fox may have something up its sleeve that will raise this light level considerably, possibly the Ventarc of Dr. Edgar Gretener of Switzerland, with whom 20th-Fox was in close contact when negotiating for the Eidophor theatre Tv system. We shall see. (See references at the end of this article.)

On one other point IP has no uncertainty—that the time has long since passed when our screen proportions should have been changed. The present standard 3 x 4 proportion has existed practically since the inception of motion pictures and has long since been outmoded. We're not ready to buy the 2½ to 1 proportion now being bandied about by the wide-screen boys, but it would seem that a 2 to 1 ratio might fill the bill. This is a job the SMPTE should do pronto.

As a matter of fact, the present situation with respect to these various processes (big screen and 3-D) cries aloud for standardization all along the line—a job that should have the benefit of the best talent from both the technical and business groups in the industry. If things run along as they now are, there's going to be one unholy mess on both the production and exhibition fronts.

Whatever happens, the industry projection-wise is practically right back where it started. The projectionist is definitely Mr. Big today, and he certainly is the man who can make or break a show.

The most pressing need at the moment with any of the processes being readied is the urgent—nay, acute—need for much more light and improved optics. Let's not forget that with 3-D we have an automatic 50% light loss due to the projector filters, plus, probably, a 15% additional loss *via* the viewing spectacles. The answer would seem to be to pour on the light—but we must have it available before we can use it. Manufacturers of carbons, optics, lamphouses, and projectors should huddle immediately and go all out on this problem of increased light. Vastly improved cooling means are a *must*, not sometime in the future but *now*.

J. J. F.

The Ivanov (Russian) system of stereoscopy was discussed in IP for April, 1941 (p. 12); December, 1947 (p. 17); April, 1948 (p. 29), and August, 1949 (p. 15).

"Cinerama: Super-Movies of the Future"; IP for November, 1950 (p. 10).

"Stereoscopic Motion Pictures," by J. A. Norling; IP for August, 1951 (p. 12); February, 1952 (p. 9); March, 1952 (p. 20).

"Three-Dimensional Projection in Europe," IP for April, 1952 (p. 9).

"The Ventarc H. I. Carbon 'Blown' Arc: A New Concept," by Dr. Edgar Gretner; IP for July, 1950 (p. 13).

"Uniform Screen Light Distribution: Elliptical Reflector Mirror"—A Symposium, by Dr. Edgar Gretener, Robert A. Mitchell, Sam Glauber; IP for September, 1950 (p. 13).

BERT SANFORD—A FRIEND

Bert Sanford, 60, tried and true friend of projectionists, collapsed and died Feb. 12 at Broadway & 47th St., N. Y. City. He was within sight in his last moments of the thoroughfare to which he had contributed so much. Sanford, in semi-retirement was a member of the Motion Picture Pioneers, the New York Variety Tent, and the 25-30 Club of N. Y. City projectionists. Sanford's first association with the industry was an actor in the D. W. Griffith productions for Biograph. He was with General Film Co. from 1912 to 1917, first as booker, later as assistant exchange manager.

An Industry Pioneer

For years he served as booker and salesman for Pathe. In 1929 he joined Electrical Research Products as sound equipment salesman. Two years later he was made manager of merchandise sales, becoming Northeastern Division sales manager in 1933. In 1937 he joined Altec Service Corp. as Eastern district manager. He was made theatrical sales manager of Altec Lansing and Altec Service in 1946. In 1949 he became identified with the ABC Vending Corp. as general sales manager. Last year he took over operation of the State Theatre in Trenton, N. J.

Removal of price controls over theatre admissions in West Germany last April did not result in any significant increase in the price of tickets, the U. S. Department of Commerce reported in November.

India has 2,700 motion picture theatres and 800 touring exhibitors, according to a report submitted by the U. S. Consulate at Bombay. Total capacity is estimated at slightly over 1½ million and daily attendance at 2 millions.

He Asked Permission to Stay

Major William E. Barber, USMC
Medal of Honor

IT WAS DURING the Chosin Reservoir withdrawal. Eight thousand weary marines lay besieged at Yudam-ni; three thousand more were at Hagaru-ri, preparing a breakthrough to the sea. Guarding a frozen mountain pass between them, Major Barber, with only a company, held their fate in his hands. Encirclement threatened him; he was ordered to withdraw. But he asked permission to stay, and for five zero-cold days the company held the pass against attack. The Major, badly wounded, was carried about on a stretcher to direct defense. When relief came, only eighty-four men could walk away. But Major Barber's action had been decisive in saving a division.

"I know," says Major Barber, "that you at home realize what hard jobs our sons and brothers are doing in America's armed forces. Maybe you *haven't* realized that you're *helping* those men—whenever you invest in Bonds. True, Bonds are personal financial security for you. But they also strengthen our economy—to produce the good arms and food and medical care that make our men secure."

Peace is for the strong!
For Peace and Prosperity save with
U. S. Defense Bonds!

Now E Bonds pay 3%! Now, improved Series E Bonds start paying interest after 6 months. And average 3% interest, compounded semiannually when held to maturity! Also, all *maturing* E Bonds automatically *go on* earning—at the new rate—for 10 *more* years. $18.75 can pay back $33.67. $37.50 pays $67.34. And so on. Today, start investing in U. S. Series E Defense Bonds through the Payroll Savings Plan at work.

The U. S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

. . . when you give your patrons the finest in projection and sound. That's why successful drive-in exhibitors the country over are installing Simplex projection and sound — they know there is none finer — none more dependable! See — hear — and you'll equip your drive-in with

Simplex

T. M. REG. U. S. PAT. OFF.

. . . because

BETTER PROJECTION and SOUND *PAYS*

MANUFACTURED BY
INTERNATIONAL PROJECTOR CORPORATION
DISTRIBUTED BY
NATIONAL THEATRE SUPPLY

BASE MAP © RAND McNALLY & CO.
CHICAGO – RL9911